VOL. V, No. 10 OCTOBER, 1950

AGRICULTURAL CHEMICALS

In This Issue:

KILLING POWER

...that's the thing!

Whatever your insecticide needs, the POWCO BRAND trade mark is your assurance of dependability... a quality more important to you today than ever before. Tightening supplies call for sound planning—advance contracting to assure sufficient supplies in 1951. For complete dependability... *look to Powell!*

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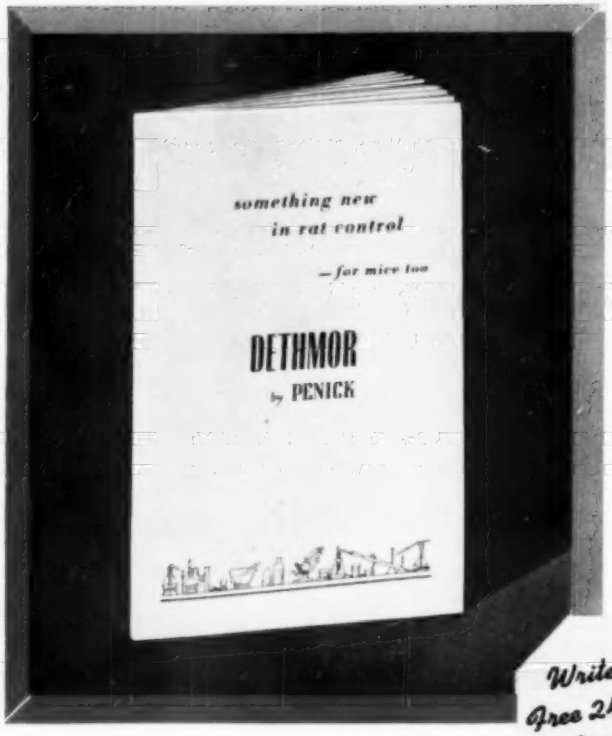

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AGRICULTURAL CHEMICALS

THIS MONTH'S COVER

Preparing many of the modern insecticides for application requires unusual caution. This worker at Hillcrest Farms, Chester, W. Va., is protected against parathion vapors by a respirator as he mixes the dust with water before spraying operations in apple orchard. (Photo by Mine Safety Appliances Co.)

OCTOBER 1950

VOL. V No. 10

A Monthly Magazine For the Trade

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AGRICULTURAL CHEMICALS

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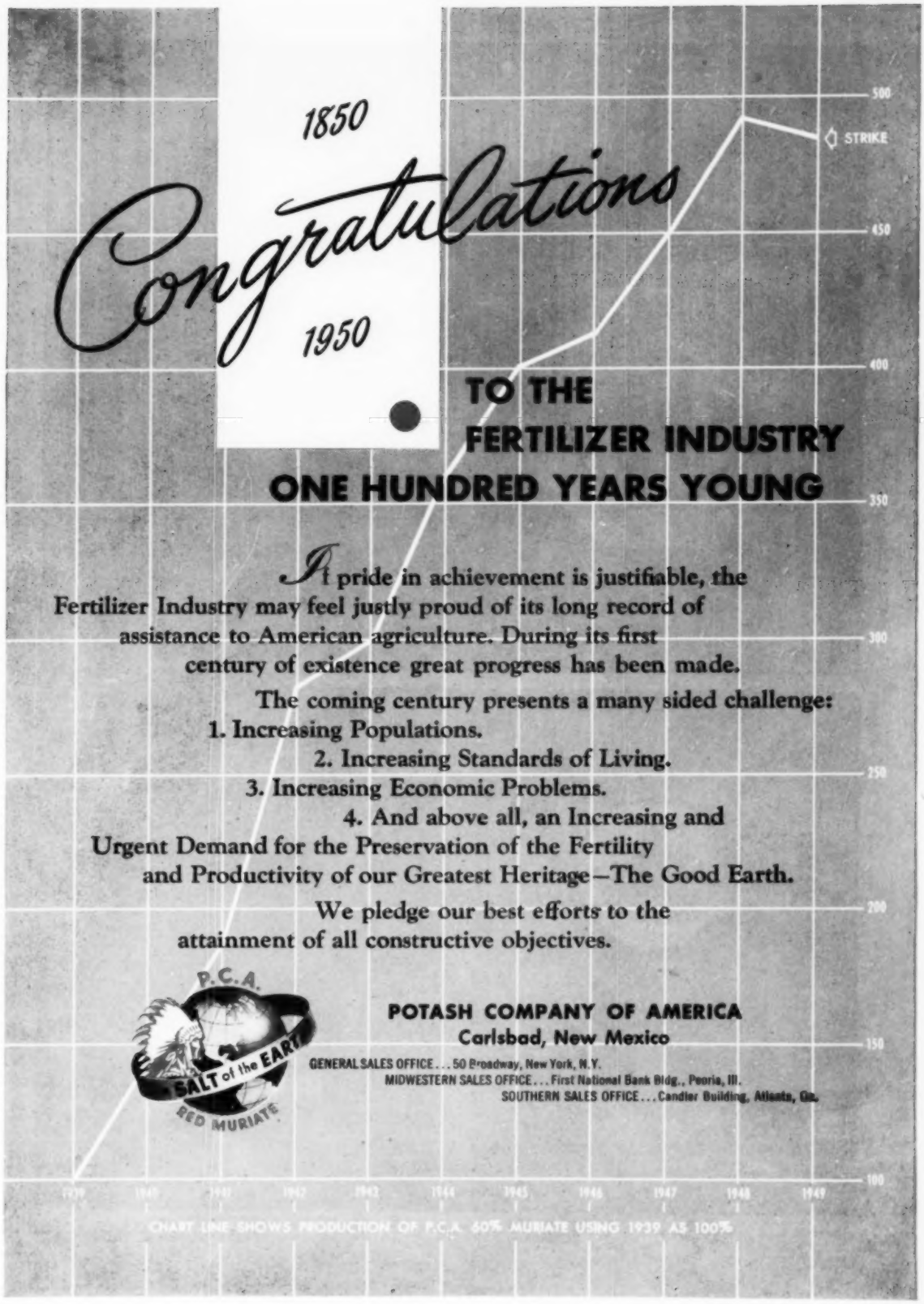

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3. Increasing Economic Problems.
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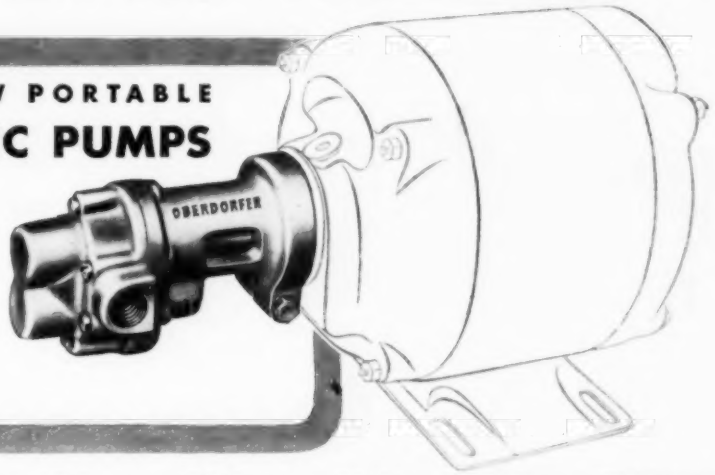

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RAX Powder, a new rat and mouse killer containing the chemical warfarin (WARF Compound 42*) is now available for general agricultural use. Farmers who used it experimentally have reported easy, economical and safe control of rats and mice on the farm. Results from all over the country indicate that RAX is 85-90% effective in killing rats and mice.

RAX is the new rodenticide developed by Wisconsin Alumni Research Foundation that kills rats and mice by causing internal hemorrhage. It is tasteless and odorless to the rodent, therefore easy to feed him in bait he will accept. Prentiss now makes RAX available for professional use, for packaging under private label or for manufacture into prepared baits that have long shelf life.

Millions of dollars worth of insecticides and fungicides are used each year to produce our nation's farm crops. But little or nothing is done to protect them from the 150,000,000 rats and untold number of mice that attack these crops in storage. $400,000,000 is a big price to pay for this damage. Rats eat or spoil half this amount yearly in cereals and cereal products alone.

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*MAN MADE MOUNTAINS

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The discharge lines are placed so that the liquid sulphur is spread in an even layer over the entire surface of the vat and is permitted to solidify uniformly. If the liquid sulphur is introduced too rapidly or is not properly distributed, pockets of liquid sulphur will be covered by a crust and remain in the solid sulphur. The low heat-conductivity of sulphur might keep such pockets liquid for a year or more.

Loading operations at one of the huge vats of Sulphur at our Newgulf, Texas mine. Such mountains of Sulphur are constantly being built at our mines, from which shipments are continually made.

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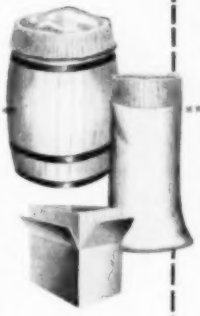

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They're crinkled and pleated for two-way stretch . . . withstand stress and strain. Safeguard product from outside contamination. Available for added protection of products packed in barrels, boxes, and bags.

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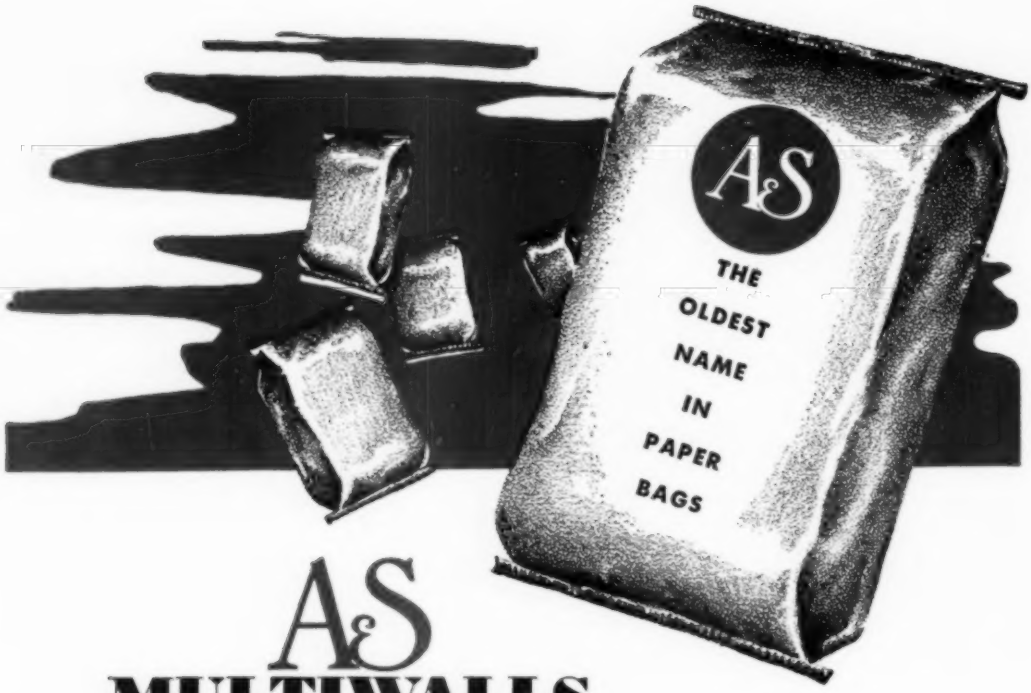

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RECENT DEVELOPMENTS FROM THE A&S PACKAGING LABORATORY

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- **ARK-TONE PRINTING** Sharp, clear color process combines perfect reproduction and brightness for consumer packages.
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- **PRESSUR-PAK BALE** Bags are packed under pressure. Saves 50% of customers' space allotted to storage.

● A&S Multiwall bags *stand up* under all kinds of shipping and storing abuse, because every ply is made of No. 1 specification kraft, and every bag must pass the rigid A&S spot inspections.

A&S Multiwalls *stand out* because they are printed on modern 4-color presses that reproduce a bag design in eye-arresting colors unsurpassed in commercial bag printing. Why not have our A&S packaging specialists analyze your packages? These men know how to build impact into the flat exterior of what could otherwise be a dull and unimaginative package. This combination of unusual design and faultless printing is yours at no extra cost.

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Take a sagebrush-infested field large enough to pasture one steer . . . remove the brush with Monsanto 2,4-D to give the grass a chance . . . and you'll develop pasture for *two* steers. Not only that, but each animal on the brush-free ground will show greater gain. These facts mean profits for formulators of herbicides.

Cattlemen are well aware of the importance of cleaning out sagebrush. They'll buy sprays to kill it. Stock your dealers in the sagebrush areas with formulations of Monsanto 2,4-D and you profit . . . your dealers profit . . . cattlemen profit.

Monsanto can make immediate shipments of 2,4-D in 100-pound fiber drums. It is a fine white powder, assaying approximately 99.0% and having a melting point of 138.0° C. min.

In correct formulations, Monsanto 2,4-D is effective against sagebrush, and a wide number of other woody plants. For further information mail the coupon or contact the nearest Monsanto Sales Office. MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1766-J South Second Street, St. Louis 4, Missouri.

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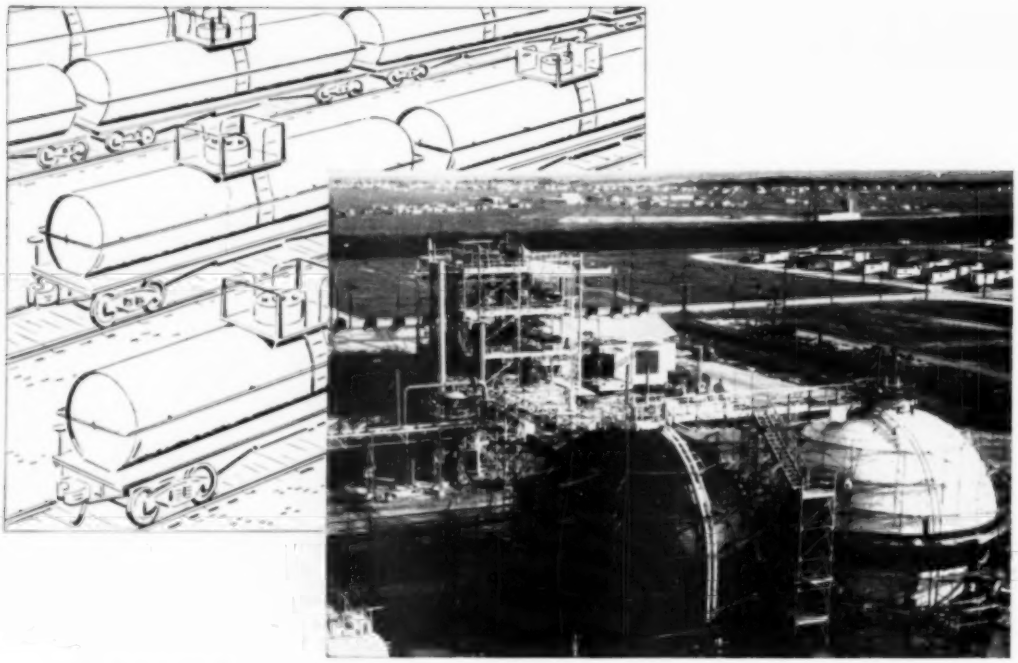

DOW'S

new Texas anhydrous ammonia plant starts shipping on . . .

The Dow Chemical Company's new Freeport, Texas ammonia plant will soon be producing large quantities of anhydrous ammonia for industrial and agricultural users. The new plant will produce refrigeration grade and technical (commercial) grade anhydrous ammonia. Shipments in tank car quantities will begin October 1, 1950.

Industrially, ammonia plays an important role in the manufacture of chemicals, plastics, synthetic fibers, oil, steel, and explosives. Anhydrous ammonia is used as a refrigeration medium, as well as in the production of nitric acid, soda ash, ammonium chloride and other ammonium salts.

It is the major source of nitrogen for the production of solid fertilizers vital to increased agricultural production. The use of ammonia for direct application is one of the fastest growing developments of the fertilizer industry.

This newest addition is another step in Dow's program of producing basic chemicals to serve more people . . . better. Your inquiries concerning this company as a source of supply for this important chemical will receive prompt attention.

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CHEMICALS

INDISPENSABLE TO INDUSTRY
AND AGRICULTURE

THE EDITOR COMMENTS

HOW can the consumer of pesticides be induced to read the labels on the containers? That is a problem being studied currently by the industry, and particular emphasis is being placed on it by the National Agricultural Chemicals Association. What's to prevent a user from applying too much spray or dust to a given crop . . . or from committing any one of dozens of other possible errors in handling powdered or liquid materials?

We feel that it can't be said too often, that *education* for the user is the only real solution. But just how is this to be brought about? Obviously, the makers of pesticides can't follow up each sale with verbal instructions; so the only direct link between the maker and the consumer is the label. It can be a real medium for education if properly utilized.

New tolerances for toxic residues are to be announced in a few months, now that the Food and Drug Administration Hearing is over, and this will undoubtedly cause a revamping in many labels. Perhaps that would be a good time to overhaul some of the present label literature, make it more readable and more understandable. Not all of it needs rewording or re-arranging, it is true. But if a label discourages reading . . . if the lettering is so fine or so poorly printed that the consumer can't read it without the use of a magnifying glass, the manufacturer in such cases may be at fault, too. He may be a direct contributor to the misuse of his products and bring upon himself the consequent troubles arising from such.

Perhaps the first step in the industry's education campaign, would be to study the label's language and its appearance from the readers' standpoint, correct any ambiguity or illegibility, and then campaign to make the user read the improved directions.

In making these suggestions, we are mindful that a large portion of the trade is putting out labels and other literature that is above reproach, but the issue is so basic that it deserves a lot of study at this time.

ONE of the most significant and accurate observations on investigations of toxic residues comes from Congressman Thomas G. Abernethy who declares that since no major crop is produced without dependence on the use of chemicals, only two possible courses of action may be taken: either proceed as at present with production of sufficient food through use of chemicals; or, create a food shortage by forbidding their use until they get the stamp of approval.

That seems to be the situation in a nutshell. To date, testimony at the House investigation has covered topics including residues on crops on which insecticides and fungicides are used, with the general recommendations that both chronic and acute toxicity studies should be made on all chemical products before they are permitted to be used in food production. It has also been pointed out that while many of the major manufacturers have laboratories to investigate the toxicity of their products, few of the smaller ones are so equipped.

One possible suggested control measure has been to amend the Food, Drug and Cosmetic Act to forbid the shipment in interstate commerce of foods containing chemicals which do not have the approval of the FDA. With such recommendations being considered more or less seriously by the Select Committee, the industry can't help but wonder where it will all end . . . or if it is going to. The Food and Drug Administration Hearing is over and residue tolerances are yet to be announced, but even then, will this be the final word?

How long is the industry to be kept in suspense, not knowing which way the axe might fall? The world needs the abundant production of agricultural products, and heavy yields of food and fibre are not possible without the help of chemicals. Yet, so much uncertainty befogs the atmosphere, that the very ones who must furnish materials to assure good crops may become hesitant about manufacturing quantities of necessary chemical products when there is a possibility of their use being restricted.

Nitrogen----

Important in Peace or War

by

J. Richard Adams

Director, Technical Service,
Spencer Chemical Co.
Kansas City, Mo.

NITROGEN is the perfect example of the childhood story, "Beauty and The Beast". In the form of plant-food, nitrogen fosters and sustains life, while in the form of ammunition and explosives it may destroy life. It is interesting to note how rapidly the metamorphosis from the "Beast" to the "handsome Prince" has taken place following international wars. This change has gone hand-in-hand with the growing independence of the United States on foreign imports. The whole picture can be appreciated best by a study of the nitrogen industry.

Early pioneers placed a fish in each hill of maize to obtain good crops. The use of natural organics as fertilizer was thus initiated in the United States. Since then, fish fertilizer has been supplemented by many other natural organics. Among these have been cottonseed meal, castor pomace, animal and process tankages, and manures. As a source of nitrogen, they are not economical since the unit cost of nitrogen in this form is high. Such materials have always been in short supply, and more lucrative fields for certain of the natural organics has led to a still shorter supply, which has further limited their use in the fertilizer industry. Their primary use now is for conditioning fertilizer mixtures and as speciality fertilizers in which slow availability of the nitrogen is desired.

This of necessity led to the use of other sources of nitrogen fertilizer. These are inorganic compounds which generally fall into three classes — naturally occurring nitrogen salts and by-products and synthetic nitrogen materials. In some cases, the synthetic nitrogen compounds have been manufactured in combination with other major plant foods.

The first appearance of inorganic nitrogen products in the world fertilizer markets was in 1813 when small quantities of nitrate of soda were exported from Peru. Growth of this industry was slow until about 1880 when Chilean nitrate of soda became the major source of fixed nitrogen for the fertilizer industry. Importations of Chilean nitrate reached their peak in 1918 when 2,066,615 tons were imported into the United States. The years just before, during, and after World War I saw the greatest consumption of

(Turn to Page 74)

Supply Situation; War threats; residue tolerances; industry's production capacity discussed at

NAC Assn. Meeting

THAT the pesticide industry is in a good position to handle any assignment that may be given it in the present emergency, was emphasized by Ernest Hart, Niagara Chemical Division, Food Machinery Corp., Middleport, N. Y., president of the National Agricultural Chemicals Association at the group's annual meeting at Spring Lake, N. J., September 6-8. The convention, held at the Essex and Sussex hotel, drew the largest attendance of any meeting in the Association's history, with over 300 registered.

The supply situation was discussed at length by several speakers, as were the possibilities of allocations, the coming Congressional Hearing on agricultural pesticides, and the current Food and Drug Administration Hearing. Dr. S. A. Rohwer, assistant chief of the U. S. D. A. Bureau of Entomology and Plant Quarantine, Washington, told the Association that proper distribution of pesticides is of utmost importance, and that the bureau of entomology is eager to cooperate with industry in working out solutions to problems of distribution and supply. He said that the present outlook is not good, and that "very strong and active effort" will be required to cope with it.

A panel on insecticidal residues in soil was presented as the final portion of the program on Friday, with participants including Dr. Victor R. Boswell, U. S. D. A.; Dr. Charles L. Smith, Ethyl Corp., New York; and Dr. Rohwer.

In his keynote address on the opening day of the meeting, Mr. Hart declared that the pesticide manufacturing industry possesses the capacity to provide protection for twice the number of acres of growing foodstuff that it had in pre-war days. He also pointed out that the industry is able not only to meet foreseeable increased demands for agricultural chemicals at home and abroad, but it also stands ready to produce destructive chemicals to kill enemy food crops should this necessity arise. The industry is much better able to cope with an emergency than it was in 1941, he declared, and has both the know-how and the capacity to do the job provided raw materials are available. "Industry's improved position to meet additional requirements results from almost revolutionary developments in the science of pest control and a sizeable increase in plant capacity," the president said. "During the past decade, many new materials have been developed, tested and marketed, which, together with improvements in other products, have provided users with the means for more effective insect, disease and weed control than ever before. Industry's materials have contributed greatly to the

Photos Below

L to R: Fred Bailey, Washington, D. C. making his talk at meeting. Center: registration girls, Misses McCauley, Martin and Grobe. Third photo: W. Mercer Rowe, Tampa, Fla., speaking from manufacturer's standpoint.

ever-increasing efficiency of agricultural production." However there is a possibility that some of the new plants might be taken over by the government if the emergency becomes acute, he warned.

Mr. Hart continued by saying that the defense production program will mean some belt-tightening in the industry, and the year 1951 will not be the same as the present year. "Changes in the economic setup are coming . . . and soon" . . . he pointed out, and these changes may continue for a long time. The shortage of raw materials may cut into the total volume of the industry, but there will be an adequate supply of pesticides to cover the food and fibre crops of the nation.

Lea S. Hitchner, executive secretary and treasurer of the Association presented a brief report of the group's activities during the past months, pointing out developments which will affect the industry. That Congress will have control of all critical materials is definite, he said, and expressed confidence that the industry will adjust itself to what ever situations present themselves in the future. He recalled that there have been three previous emergencies through which the group has passed successfully (World War I; the NRA and World War II) and predicted that the leaders in the agricultural chemical field will work together to pull the industry through future emergencies in the same manner.

Mr. Hitchner recommended a survey by the U. S. D. A. to determine requirements for agricultural chemicals. "Such a survey should show the crops requiring protection, pests and diseases to be controlled, public health needs and tonnages of agricultural chemicals required," he pointed out. "We have every reason to expect that many raw materials used by this industry will be needed urgently for other essential defense needs. This survey by the U. S. Department of Agriculture would permit manufacturers to plan production schedules, inform growers of avail-

Photos. Below:
Top picture. (L to R): E. A. Georgi, United Cooperatives, Inc., Philadelphia, Pa.; John A. Rodda, U. S. Industrial Chemicals, Inc., New York; and J. I. Shafer, B. G. Pratt & Co., Hackensack, N. J.
Lower picture: J. S. Chase, Port Fertilizer & Chemical Co., Los Fresnos, Texas; Phil Lobue; L. W. Gopp, Michigan Chemical Corp., Saint Louis, Mich.; Dick Hartley, Velsicol Corp., Chicago; and T. W. Brasfield, U. S. Rubber Co., Naugatuck, Conn.

able materials, and would guide agricultural colleges in recommending control programs." The NAC secretary reported that the Association has offered Secretary of Agriculture Charles F. Brannan its cooperation in this matter, and that the matter is now under the consideration of the Department.

Mr. Hitchner announced the formation of a Defense Production Committee composed of industry leaders experienced in production and distribution. "This committee is prepared to cooperate with all agencies and groups interested in supplying users with adequate amounts of materials required to meet the food production goals recommended by the U. S. D. A.," he explained.

Avery S. Hoyt, chief of the U. S. D. A. Bureau of Entomology and Plant Quarantine was unable to appear on the program in person, but his prepared paper was presented by Dr. Rohwer. In it Mr. Hoyt urged close cooperation of the Department and industry to develop more economical, better and safer measures for controlling insects. Insecticidal chemicals serve as the major and most useful means available for the prevention or reduction of losses caused by insect pests.

"Many of the new materials of insecticidal value originate in industry sources," he stated. "Those which show promise are subjected to tests by federal entomologists, and on the other hand, industry cooperates by devising methods for large-scale manufacture and production of new materials developed by government workers and found to be effective for public use."

In the Photos

Top (L to R): J. Everett Bussart, Velsicol Corp., Chicago; C. L. Hovey, Eastern States Farmers' Exchange, W. Springfield, Mass.; John Van Geluwe, GIF Soil Building Service, Ithaca, N. Y.; Frank Woods, General Chemical Div., New York; and B. A. LaForge, S. B. Penick & Co., New York.

Next to top: Lawrence Harman, Geigy Co., Walla Walla, Wash.; C. C. Alexander, and M. J. Bunnell, both of Geigy Co., Inc., New York; and L. G. Matthews, American Smelting & Refining Co., New York.

Right center: H. F. Seeland and Mrs. Seeland; Friar Thompson and Mrs. Thompson, Prentiss Drug & Chemical Co., Inc., New York; and Eugene Heckathorn, Heckathorn & Co., Ltd., Richmond, Calif.

Next-to-bottom picture: John D. Conner, NAC Counsel; Mrs. Conner; and Donald G. Lerch, Jr., NAC editor. Bottom picture, E. W. Bodine, Shell Chemical Corp., New York; Mr. Heckathorn again; and Dr. S. A. Rohwer, assistant chief, Bureau of Entomology & Plant Quarantine, U.S.D.A., Washington, D. C.

Below: J. Hallam Boyd, Commercial Chemical Co., Memphis, Tenn; A. G. Gunderson, Sherwin-Williams Co., Cleveland, Ohio; and J. V. Vernon, Niagara Chemical Div., Middleport, N. Y.

"The primary objective of the Bureau is to protect agriculture from insect pests," the chief declared. Recalling the steps taken during World War II to aid agriculture in securing an adequate supply of needed insecticides, he made it clear that should supplies of basic materials required for insecticide production again come under allocation, the Bureau would be interested in doing everything possible to insure that the interests of agriculture are protected adequately.

Invited to speak briefly at the Wednesday morning session, L. C. Dilworth, managing director of the National Cotton Council, Memphis, Tenn. told the group that cotton production in 1951 must be greater than it was this year if all of the needs are to be met. He pointed out that in war time, cotton is regarded as the second most important commodity. The growers will need insecticides in great quantities to produce an adequate crop, he stated.

W. Mercer Rowe, Flag Sulphur & Chemical Co., Tampa, Fla., spoke from the viewpoint of a formulator, pointing out some of the factors involved in producing safe and effective insectides. He said that formulators need more information on the compatibility of toxicants, including their pharmacological and toxicological properties in packaging various products. In fact, he stated, more information is needed on packaging itself since the containers vary in quality from paper sacks to airtight metal cans and boxes.

Mr. Rowe emphasized the importance of favorable public relations, reminding that most of the information about pesticides is given to the public in the form of over-dramatized stories, or as critical copy which has an adverse effect on the industry. He averred that the industry should not always be on the defensive, but should take an aggressive stand to let the people know of the importance of pesticides in supplying the nation with food and fibre.

On the credit side, however, Mr. Rowe pointed out that publicity concerning the current FDA hearing has been favorable, and has probably left a considerable impact on the thinking of many people.

Fred Bailey, executive director of the National Agricultural Research, Inc., Washington, D. C., discussed the impending Congressional Hearing which he said is likely to begin soon. He assured the group that the Hearing will not take on the aspect of a "witch hunt," but indicated that it may continue for six months or more. He said that the objectives of the Committee (formed under terms of the Sabath Resolution, HR 323) are, in order of their importance: 1. to protect the interest of consumers; 2. to protect the interest of the user, and 3. the interests of the chemical manufacturing industry. Mr. Bailey expressed doubt that any legislation resulting from the Hearing would be in effect before 1953.

President, Board of Directors Reelected

Association members re-elected as president, Ernest Hart, Niagara Chemical Divison, Food Machinery Corp., Middleport, N. Y. The group also voted to leave unchanged the Association's board of directors.

In commenting upon the increase of agricultural production brought about in part by the use of chemicals, he pointed out that a hundred years ago it took eight people on farms to feed themselves and two people in cities. Today, two persons on farms feed themselves and eight city people, and still have enough of a surplus to feed two additional persons in other countries. "If the science of combatting plant and animal diseases and pests were lost to man, a major portion of the world's population would perish within a few years," he observed, and continued by saying that scientific research, though long and tedious of necessity, pays big dividends.

FDA Hearing Reported

JOHN D. Conner, Association counsel, told the NAC group that the importance of filing industry briefs is of particular importance in connection with the establishment of sound residue tolerances for agricultural chemicals used on fresh fruits and vegetables. Mr. Conner stressed that industry's part in this program is of utmost importance. He pointed out that the Hearing has been conducted in an atmosphere of mutual constructive cooperation between the Food and Drug administration and all interested parties. "Only through such cooperation," he said, "can practical regulations be evolved which will be adequate to the consumer, the farmer, and the manufacturer."

In pointing out the wide discretion granted the administrator in setting the proposed tolerances, Mr. Conner told the industry members present that their job is to assist the administrator through briefs, in correlating the estimated more than six million words of evidence, and then applying it to the legal concept specified by Congress in section 406 (a) of the Food, Drug and Cosmetic Act. If done properly, he said, the regulations which come from this information will permit prudent use of pesticides without undue restriction upon the farmer and with assurance of safety to the consumer.

A.M.A. Represented

DR. Bernard Conley, Chicago, representing the committee on pesticides of the American Medical Association, reviewed the development of the committee which was originally established to answer inquiries, but grew into a broader entity as the need for more information and education developed. Dr. Conley stated that objectives of the committee included the promotion of safe standards of use; the development of antidotal measures; the stimulation of voluntary control and the achievement of standard nomenclature for various products and compounds.

He said that new attention is being paid to safety standards for pesticides, particularly in the interest of public health. The relatively small amount of published information has been a handicap, but details on accidents and their prevention are being

(*Turn to Page 73*)

Does the organic farming cult have a case against

CHEMICAL FERTILIZERS?

If scientific data exists supporting claims that chemical fertilizers are harmful, or that plants fed exclusively with organic materials develop disease and insect immunity, this reporter fails to find them.

By Frank J. Reilly

ONE of the most annoying problems facing the fertilizer industry of the United States today, as well as those who make fertilizer recommendations, is the almost fanatical anti-fertilizer propaganda being disseminated by the pro-organic groups. To add to the difficulty of meeting the problem is the apparent impossibility of locating any unbiased scientific facts from the pro-organic gardening cult. It would seem that where there is so much smoke there may be some fire, but also where fanatics become involved in matters affecting food, diet, bodily health, etc., they seem unwilling to approach the subject dispassionately, or perhaps are incapable of discussing it on the essential detached scientific basis.

This reporter has been digging into the subject over recent weeks, following the publication in the June isue of *Agricultural Chemicals* of an article by Donald P. Hopkins, "Anti-Fertilizer Activity in Britain." In a series of letters and interviews with some of the leaders of the pro-organic group as well as with experiment station personnel and figures in the commercial fertilizer industry, a number of interesting angles on the story have been disclosed, which may well be worth repeating for the wider knowledge of manufacturers, distributors, and users of fertilizers, as well as insecticides and fungicides.

First step in our search was to write a letter to J. I. Rodale, editor of *The Organic Farmer*, Emmaus, Pa., in an attempt to find out what actual facts the proponents of the organics have to support the sweeping claims which they commonly make. Quotations from our letter follow:

> "I was interested in reading your brochure on organic farming and particularly the part where you explain organic farming and the fact that chemical fertilizers are harmful. Your discussion is very interesting but I should like to have more information. You mention, "and now comes evidence given by a great scientist connected with Cornell University that a commercial fertilizer is responsible for bringing about human disease." I should like to have a little more specific information on two or three things. What is the evidence that has been uncovered lately? Also, what is the name of the "great scientist" from Cornell who states that commercial fertilizer is such a culprit? I should also like to know what specific human disease is caused by the use of commercial fertilizers.
>
> The booklet to which I refer also states that "It has been demonstrated time and again that when a plant has been invigorated through feeding on its natural food, that is, organic matter, its tissues develop a healthy taste which is not relished by insects." I wonder if any scientific evidence is available to support this statement and if any studies have been made by recognized agencies along this line."

The following excerpts are from Mr. Rodale's reply:

> "In reference to your inquiry about the Cornell scientist who found chemical fertilizers to be detrimental, I am enclosing our editorial which appeared in the April 1949 issue of "Organic Gardening. Evidences of other human diseases resulting from the use of chemical fertilizers have been detected by various investigators. The relationship between certain chemicals and cancer has been discussed by our editor, Mr. Rodale, in a series of editorials in the Organic Gardening magazine from May 1949 to May 1950.
>
> Experiments regarding the resistance of plants grown organically to insects and diseases have been started at the Connecticut Agricultural Experiment Station at New Haven, Conn. Complete evidence is not available as yet from this source. However, through experimentation at our own experimental farm of sixty acres, we have found a direct correlation between the organic method of growing plants and insect and disease resistance. These experiments have been performed on an impartial basis and are backed by a large accumulation of data submitted by our readers. This supporting evidence submitted by our 130,000 subscribers, although not based on the same scientific principles as that of our studies on the experimental farm, is however, volumous enough to remove any doubt that such a correlation does exist.
>
> There are several factors which have led to the reduction of protein content of grains in the

middle west. In the first place, the extensive use of chemical fertilizers and the rapid depletion of our soils by erosion in the middle west and other parts of the country are linked, being to a great extent a cause and effect relationship. Chemical fertilizers are highly water soluble when applied to the soil. When applied in large quantities, they are leached through the soil to the subsoil where they react with colloidal clay particles to form hardpans. These hardpans are impervious to water penetration and thus cut off subsoil from the surface layer. Subsequent rain will saturate the soil only to the depth of the hardpan. After this layer has held its capacity of water, runoff results and severe erosion follows. Rain therefore is not retained by the soil where nature meant it to be held, but it runs off, filling our streams and rivers, causing floods. Since the water has not penetrated the subsoil, the water table drops and we then have droughts and water shortage, as it being experienced in New York today.

> Chemical fertilizers provide plants with only the major nutrient elements, i.e., N, P, K. No provision is made for the supply of trace elements which are greatly needed for the formation of complex protein compounds."

Nitrate Disease Cause?

WITH this letter was a reprint of an article, "Nitrate Attacked By Soil Scientist" from the April, 1949, issue of *Organic Gardening*, another publication edited by Mr. Rodale. The article reprinted portions of a prior article, "Nitrate in Foods and Its Relation to Health," written by Dr. J. K. Wilson of the Department of Agronomy, New York State College of Agriculture (Cornell) and published in the January, 1949, issue of the *Agronomy Journal*. Dr. Wilson, who has since died, thus making it impossible to check with him on his findings and his opinions, is reported to have suggested that excess nitrate in foods fed to infants may contribute to the disease, hemoglobinemia. The following paragraphs from his article present this suggestion:

> "Weast (4) reported cases of hemoglobinemia in infants caused by nitrate in the drinking water and suggested the maximum safety limit of 10 parts of nitrate nitrogen per million parts of water. He pointed out that doctors in Illinois have been advised not to prescribe feeding formulas involving water unless the nitrate content of the water is known to be within this limit. If the formulas contain vegetables, . . . it is clear that the nitrates of such vegetables as spinach, lettuce, celery, turnips, and certain others may be far more potent in producing hemoglobinemia than that of the drinking water." . . .
>
> "Leafy vegetables, frozen foods, and prepared baby foods were analyzed for their content of nitrate. From the findings it is suggested that the nitrate in such foods may contribute to hemoglobinemia found in infants and may produce certain toxic, if not lethal, conditions in adults. The high content of nitrate in the foods may be attributed in many instances to the application of nitrogenous fertilizers, especially nitrate of soda, to the growing crops."

Essentially what Wilson said in his article then was that "it is *suggested* that the nitrate in such foods *may contribute* to hemoglobinemia found in infants." Publishers of *The Organic Farmer* were apparently not quite satisfied that this was a strong enough statement, for in a pamphlet which they distribute to prospective subscribers to their publication they hopped up the Wilson observation quite a bit, coming out with the broad general statement "now comes evidence given by a great scientist connected with Cornell University that a commercial fertilizer is responsible for bringing about human disease." Wilson's *suggestion* that excess nitrate may *contribute* to one specific disease in infants is of course a long way from the general inference they leave in the minds of the unsuspecting that "commercial fertilizer is responsible for bringing about human disease."

This same theme of suspecting excess nitrate of responsibility for infant disease recently received attention in the July 24th issue of the *New York Herald Tribune* which reported under an Atlanta date line that a child living in Screven County, Georgia, and suffering frequent attacks of cyanosis, or blueness, was found to be suffering, not from congenital heart disease, but rather from nitrate pollution of drinking water. Investigation was reported to have disclosed that the child's father, a farmer, had stored nitrate fertilizer too close to the well and seepage had caused the water to show a nitrogen content of 7.5 parts per million.

Toxicologists would of course be quick to point out that an excess of such non-harmful materials as water, salt, air, etc., can also be dangerous, even fatal upon occasion. Dr. Herman A. Shelanski of the Industrial Toxicology Laboratories, Philadelphia, stated the case briefly in an address before the Chemical Specialties Manufacturers' Association meeting in Washington, December, 1949. He said:

> "May I point out that there is no non-toxic substance. Water is considered non-toxic, but the results are obvious if one would attempt an eight-hour exposure to it by inhalation. As mentioned before, we are fond of seasonings to varying extents, but a single large dose of a substance as commonly used as sodium chloride would be fatal. And, finally, the most common substance to which we are exposed is air. It covers our entire bodies, we inhale it, we are bathed in it, and we swallow it without harm to us, but if we take a few ml. of air intravenously, the results are fatal."

Organic "Farmers" Hard to Find

THE pamphlet, referred to above, distributed by *The Organic Farmer*, is documented with seven or eight letters stated to be from "farmers who are applying the organic methods successfully."

The letters are all of a pattern, reading in general like the testimonials which used to accompany patent medicine advertisements of the nineties, telling how one bottle of "Squack Juice" cured the patient of heart trouble, in-grown warts, falling hair and a mild case of cancer. One letter described how a practitioner of the art of organic farming shuns the products of the chemical laboratory, not only in his choice of fertilizer but also in his selection of insecticides. "With the market overflowing with powerful, death-dealing destructives with which to slay the beetles and leaf eaters," all this follower of the organic cult uses is "a light dusting

of common plaster." We wonder if he is familiar with the fact that plaster often contains sulfur as an impurity, "deadly" ingredient of many commercial insecticides and fungicides?

An executive of a company engaged in the manufacture of fertilizers, insecticides and numerous other chemicals was sufficiently interested to have some of his field men check up on several of the writers of these testimonials. They turned out to be rather difficult to locate and interview, as none of them seemed to be in the class of stable established commercial growers. A typical case was Farmer B. . . . who was found to be "farming" not more than three or four acres. He was described by neighbors as a "nut" and as a "big bag of wind." His supply house had him on C. O. D. terms after taking six months to collect a small bill. An eccentric in his handling of correspondence as well as in ideas on farming, he simply refused to answer letters addressed to him querying him as to his opinion on organic farming.

Another "farmer" of the organic school had gained his experience, it developed upon investigation, taking part time care of a half-acre plot while working days in a steel plant. Still another writer of a testimonial letter had indeed twelve acres of land,—all in front of his house. Farming must have been strictly a side line with him, as it developed that he drove a milk truck and ran the town school bus. None of the so-called farms checked on could remotely have been called prosperous, or in reality, farms. Outbuildings were in poor condition, live stock population scanty and scrawny, fields rutted and houses in need of paint. Hardly the glowing picture of abundance through organics painted in *The Organic Farmer's* circular.

As for the editor and publisher of the magazine, J. I. Rodale, he described himself when testifying earlier this year before the Spray Residue Tolerance Hearings conducted by the F.D.A. in Washington, as a high school graduate, a manufacturer of electrical products, and an accountant, with no scientific background other than knowledge acquired through reading and conferences and as a result of experience in the operation of a 60-acre farm near Allentown, Pa. In the course of his cross examination, incidentally, it was brought out that Mr. Rodale himself uses chemical sprays on the trees on his farm prior to the formation of fruit.

In his direct testimony, he again attributed the water shortage, which was still an acute problem in New York last April at the time he testified, to the use of chemical fertilizers which he asserted formed "hard pan soils" which make the "water run into the ocean." In a news letter commenting on his testimony the American Plant Food Council commented that "he failed to explain why the reservoirs were not filled while this run-off water was en route to the ocean." (And it would be interesting now to have his explanation of how the "hard pan soils" softened up so rapidly that the reservoirs have again filled. Ed. Note)

It is apparent that nothing sound, nothing unbiased or scientific can be looked for from this direction. If these ardent supporters of the organic case have factual evidence to support their stand, they have failed to present it publicly as far as we can find out. That they have done any research work worthy of the name to support their fanatical conclusions, we doubt. They fail to present any evidence, but are very positive in the statement of their beliefs. If there is any possibility of a case to be made for the exclusive employment of organic fertilizers, it is in all probability being hurt rather than aided by such endorsement.

Louis Bromfield's Views

LOUIS Bromfield, well-known author and operator of a commercial-size model farm, "Malabar Farm," in Ohio, would seem to be a much weightier influence. However, while espousing the organic theme both in his writings and in his farm practice, he recognizes that "it is impossible for this country to do without chemical fertilizer . . . these people who believe only in organic farming, who say everyone will be poisoned by chemical fertilizers, are essentially wrong."

Mr. Bromfield has also indicated in a private communication to the publishers of *Agricultural Chemicals* that he is "by no means opposed to the use of fungicides or insecticides where they are necessary." He points out that they are used on occasion at Malabar Farm, although he believes that the need for their use often arises largely from poor and unbalanced soils. However, he is careful to point out that he has "never held that (even) properly balanced soil could be the *total* cure for insect attack, though it certainly provides plants with greater resistance and acts as a preventive."

No Data Yet At Connecticut

FOLLOWING another tack in our pursuit of some actual dependable scientific data on this extremely controversial issue, we contacted the Connecticut Agricultural Experiment Station which has started a program of experimental work in an attempt to determine whether there is anything in the thesis that plants grown organically develop any particular resistance to insects or diseases. Dr. J. G. Horsfall, director of the station, replied as follows:

> "We have under way a rather extensive project in the testing of organic matter in the soil and will be making observations on the attack of insects and diseases on experimental plants. This is just getting under way, and we don't have any data yet."

Insect Control Thru Diet

WORK has been proceeding at the University of Missouri, Columbia, Mo., under the direction of Dr. Leonard Haseman in an attempt to determine whether or not it is possible to influence insects unfavorably by manipulating the soil fertility or by varying the level of the different soil minerals, including the minor elements. "With some of the insects which we have included thus far in our studies," Dr. Hase-

(*Turn to Page 70*)

Evidence toward amending regulation for fluorine tolerance presented at Part "E"; Levinson names deadline Nov. 15 for filing briefs; final witnesses testify on relevant points not covered before; as

FDA HEARING ENDS

DURING the final week of the Food and Drug Administration's spray residue tolerance hearing, evidence under Part E was heard, and the hearing was concluded on September 15. Part E covered evidence on amending the regulation which established the fluorine tolerance, other relevant information not covered in Parts A, B, C and D, and additional evidence on phases of the hearing not fully covered previously.

At the conclusion of the hearing, the Presiding Officer announced that sixty days would be the filing of briefs by interested parties. The closing date for the submission of briefs is November 15, and the Food and Drug Administration is expected to issue its proposed findings of fact and conclusions sometime during the first half of 1951.

Dr. John P. Frawley of the Food and Drug Administration reported, on the day before the hearing, ended, on the limited experimental work undertaken by Food and Drug to determine the possibility of additive toxicity from feeding a mixture of six common insecticides. The feeding experiment revealed marked liver damage which appeared to be approximately additive, that is, roughly equivalent to the total of the damages that would result from each individual constituent. Dr. Frawley believes that the sum total of a mixture of chlorinated compounds ingested daily should not exceed the safe quantity established for the most toxic constituent in the mixture. This same formula should be applied to the organic phosphate insecticides since, on the basis of present knowledge, any mixture of these compounds must be considered to be additive in its physiological response.

When the hearing resumed on September 11, the first witness was Joseph Callaway, secretary of the Food Standards Committee of the Food and Drug Administration, who testified on the necessity of amending the order promulgating a tolerance for fluorine on apples and pears.

Dr. Edwin P. Laug, of the Food and Drug Administration stated that the best measure of the toxicity of cryolite and other compounds of fluorine is the effect on teeth. In his opinion, the intake of fluorine from any source should not go much above 1 milligram per day, based on extensive surveys of the water supplies throughout the United States.

Thomas F. Cleary, representing the Geary Chemical Corporation, presented additional residue data on "Metacide." He also testified on the insecticidal activity of "Potasan" or "E-838" and its toxicity to warm blooded animals.

Dr. Floyd F. Smith, of the United States Department of Agriculture, presented evidence on the residues on tomatoes and cucumbers of parathion, "sulfotepp" (tetraethyl dithiopyrophosphate) or DDT following application of these insecticides in aerosols. He also reported on a series of experiments on residues of tetraethyl dithiopyrophosphate on lettuce leaves.

Dr. R. H. Carter, also from the U. S. D. A., discussed the persistence of parathion residues on apples and the limited amount of information available on parathion residues on peaches as well as on grapes, lemons, lemon peel and pineapples. He also discussed arsenic and methoxychlor residues on cherries when applied as dusts or sprays, and residues of chlorinated insecticides on peaches.

Charles Tressler, Jr., in charge of the chemical laboratory of the National Canners Association, presented testimony to supplement that already offered on residue analysis of several insecticides on green beans and apricots. His testimony included information on the possible residue hazard resulting from the use of DDT dust, DDT spray, methoxychlor and parathion on green beans, with particular reference to the canned product, and on apricots.

Dr. Oscar H. Hammer, appeared on behalf of the Dow Chemical Company, and discussed the toxicity of "K-6451" when used for the control of mites.

George E. Lynn, also appearing on behalf of the Dow Chemical Company, discussed studies to determine the residues on apples, peaches and prunes at harvest following spray applications of "K-6451," an experimental miticide not yet recommended for commercial use. He also described experiments in California to determine the residues of "K-6451" on fruit and vegetation from sprays applied at various intervals prior to harvest to apricot, pear, plum and prune trees and to determine the loss of residues from oranges by weathering and washing.

Dr. J. Nelson Judy, testifying on behalf of the United States Rubber Company, discussed methods of analysis for "Aramite" and "Aramite" residues. He summarized the work done on residues of "Aramite" on apples in Connecticut, Vermont, Illi-

by

John D. Conner

nois and Pennsylvania. A limited amount of work on analysis of the material on oranges and peaches has been done. Dr. Judy also described a method of analysis for "DCNQ," which is the active ingredient of the fungicide, "Phygon." A second witness for United States Rubber Company, Dr. Philip Paul, discussed residue data on "Phygon XL" on apples and tomatoes.

Frederic Rieders, testifying for Sharples Chemicals, Inc., discussed residues of "Endothal" on vegetables and described work to determine its stability when exposed to air.

Dr. S.E.A. McCallan, of the Boyce Thompson Institute, described experiments in detection of off-flavors in processed foods containing insecticides by non-professional tasters.

Dr. Karl Henry Krieger, testifying on behalf of Commercial Solvents Corporation, summarized the results of laboratory tests on the effectiveness of "Dilan," "CS 645A" and "CS 674A."

Dr. John A. Riddick, also of Commercial Solvents, discussed a minor revision in the analytical method for determination of "Dilan" and tests on residues and penetration of this product in fruits and vegetables. He also presented letters and reports dealing with tests made of its insecticidal properties. Dr. Joseph N. Spencer, of the same company, reported on the chronic toxicity of "Dilan" in the diet and the storage in the animal body.

Dr. Berton C. Dickinson, of United States Industrial Chemical Co., Inc., stated that it was necessary to develop calculations of theoretical maximum residues of piperonyl cyclonene because of the lack of suitable chemical methods to make actual analytical determinations. In his testimony, he showed the maximum theoretical residues of piperonyl cyclonene on various crops. He also discussed the insecticidal effectiveness of "Compound 469."

Dr. J. L. Horsfall, of American Cyanamid, discussed additional claims for the use of parathion which have been accepted by the Insecticide Division of the Department of Agriculture as well as additional uses which are acceptable to certain states.

Dr. Harvey B. Haag, of Rohm and Haas, described an experiment designed to explore the effects of "Dithane Z-78" in the gastrointestinal tracts of rats.

L. O. Van Blaricom, testifying on behalf of the National Canners Association, described experiments to determine the effect of sevaral organic insecticides on the flavor of fresh, frozen and canned Alberta peaches. Charles Tressler, Jr., again testifying for National Canners, described the results of tests to determine whether the flavor of canned samples of fruit and vegetables treated with various insecticides varied in any way from the normal flavor. William Arthur Rawlins, of the same association, described flavor and odor tests conducted at Cornell University on potatoes grown in soil which had been treated with benzene hexachloride for wireworm control.

Dr. Jacob N. Wickert, of Union Carbide and Chemical Corporation, reported on the results of additional tests made to determine 2 heptadecyl glyoxalidine residues on fresh, frozen and canned cherries and apples. William N. Moore, of the same company, introduced an exhibit showing results of residual analyses of the copper zinc chromate complex on potatoes, and Dr. Fred R. Whaley, in commenting on this exhibit, stated that differences in geographical locations have a more important effect on metal residues than does the nature of the fungicide treatment. Dr. Richard H. Wellman explained tde treatment which had been given the various lots of cherries and apples which Dr. Wickert discussed in his testimony. Dr. Wellman decribed a method of calculating the amount of 2 heptadecyl glyoxalidine applied to cherry and apple trees in line with good agricultural practice. He also calculated the amount of copper zinc chromate complex expected to be applied to an acre of potatoes.

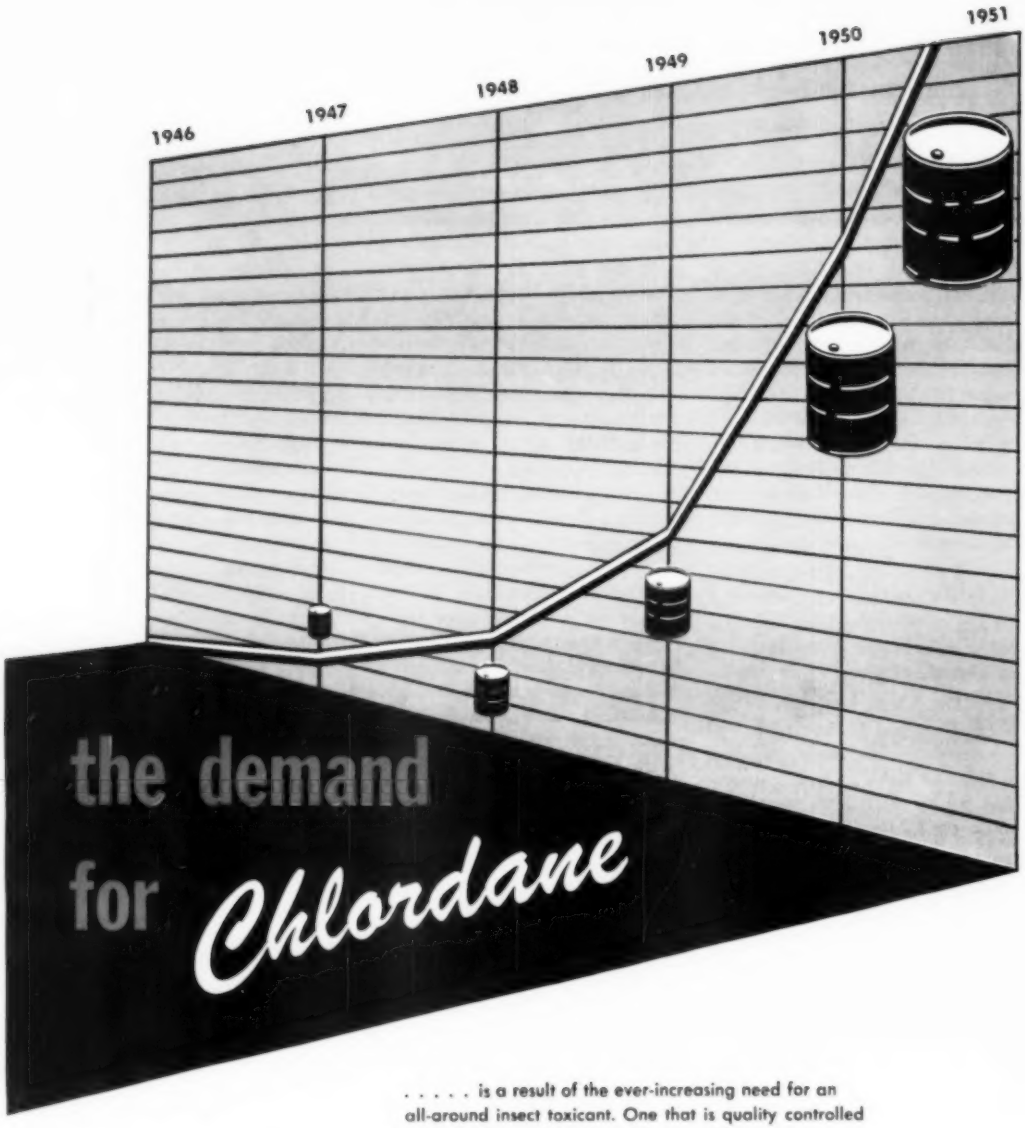
Dr. Frank R. Dutra, of Julius Hyman & Company, reported on experiments with large animals fed aldrin and aldrin sprayed hay. He also discussed experiments with laboratory animals fed dieldrin and aldrin. Dr. A. R. Borgmann, of the same company, presented additional data on the toxicity of dieldrin and aldrin. A. A. Danish presented exhibits dealing with the control of grasshoppers obtained with various insecticides, the effect and residual characteristics of these insecticides, and analyses for residues of aldrin and dieldrin on peaches.

Dr. Oliver Grummitt, testifying on behalf of the Sherwin Williams Company, described the uses for which "Dimite" is effective, the dosage recommended, and the analytical methods for determining the presence of the compound.

Dr. T. Walter Reed, of the California Spray-Chemical Company, described an experiment to evaluate the toxicology of small amounts of weathered phenyl mercury spray residues ingested on apples. He discussed the analysis of tomatoes, cherries, peaches and apricots for residues of "SR-406."

Dr. C. O. Persing, of Stauffer Chemical Company, presented additional testimony on compound "R-242," an agricultural acaracide, and discussed tests on fruit trees sprayed with this compound. Dr. Lloyd W. Hazleton, testifying for Stauffer Chemical Company, enlarged on testimony presented earlier on the toxicity of compound "R-242" as determined by chronic feeding experiments.

Thomas F. Cleary of Geary Chemical Company, discussed the activity of "Potasin," or "E-838," against certain insect pests and the method of analyzing various vegetables for residues of this insecticide.



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How new agricultural chemical practices affect law enforcement is discussed as

State Control Officials Meet

Problems in connection with mixing insecticides in fertilizers brought out; public health angles of economic poisons in spotlight on final program.

THE meetings of four associations of state control officials were to be under way at the Shoreham Hotel, Washington, D. C. the first week of October. The organizations are Association of Official Agricultural Chemists (AOAC), October 1-3; Association of American Feed Control Officials, October 4 & 5; the Association of American Fertilizer Control Officials, October 6; and the Association of Economic Poisons Control Officials on October 7.

Each meeting program included the presentation of papers, election of officers, and discussions of testing methods and analysis. The annual dinner of the Chemical Control Committee of the National Fertilizer Association was to be held at the Mayflower Hotel, Washington, on October 5; and on October 6, the American Plant Food Council was to hold a dinner in honor of the American Fertilizer Control Officials in the Shoreham.

Speakers at the AOAC meeting had not been announced as we went to press, Henry A. Lepper secretary, explaining that the referees to appear would need more time to file their reports for the convention.

Dr. L. E. Bopst, College Park, Md., secretary of the Feed Control Officials, indicated that their programs would include Edward Griffin, Allied Mills, Chicago; Dr. F. B. Morrison, Cornell University, Ithaca, N. Y., and president of the Morrison Publishing Co.; Dr. H. R. Bird, U.S.D.A., Beltsville, Md.; Lloyd Larsen, secretary of the American Dehydrators Assn., Chicago; and another representative of the U. S. Department of Agriculture.

Officers were to be elected by the Feed Control Officials on October 5, Dr. Bopst said. Present officers are: Bruce Poundstone, Lexington, Ky., president; M. P. Etheridge, State College, Miss., vice-president and Dr. Bopst, secretary-treasurer.

Dr. B. D. Cloaninger, Clemson, S. C., secretary of the Fertilizer Control Officials, stated that their program would include talks by Clifton A. Woodrum, president of the American Plant Food Council and Dr. Russell Coleman, president of the National Fertilizer Association, both of Washington, D. C.; discussions of pasture fertilization, the mixing of insecticides with fertilizers, and papers covering various testing and analyzing procedures. Others who were to appear on the program included John B. Smith, Kingston, R. I., president of the Fertilizer Officials; Dr. Kenneth Beeson, Cornell University; Walter Scholl and H. M. Wallace, U.S.D.A. Washington; L. C. Jacobs, supervisor of Feeds, Seed and Fertilizers, Nashville, Tenn.; and Dr. S. F. Thornton, F. S. Royster Guano Co., Norfolk Va.

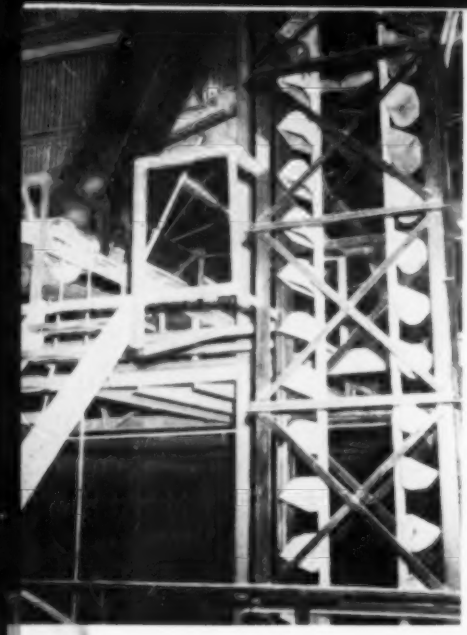
The final day, October 7, was to be completely occupied by the meeting of the Economic Poisons Control Officials. Dr. Albert B. Heagy, College Park, Md., secretary of the group, had announced that the program would include talks by Dr. J. F. Fudge, College Station, Texas, president of the A.E.P.C.O.; Dr. J. G. Townsend, medical director, chief of the industrial Hygiene Division of the Public Health Service; Wm. O. Buettner, executive secretary of the National Pest Control Association, New York; B. E. Conley, American Medical Association; and Dr. F. C. Bishopp, Assistant Chief, Bureau of Entomology and Plant Quarantine, U. S. Dept. of Agriculture, Washington, D. C.

Full reports of the meetings will be carried in the November issue of *Agricultural Chemicals*.

Fertilizer

on increase at Buhner's new plant in Illinois

Acid - water mixer a feature of plant; conveying system cuts down much hand labor; shipping department streamlined to handle 60 tons per hour with small crew; most fumes eliminated.



PRODUCTION of fertilizer materials is moving along satisfactorily at the new plant of the Buhner Fertilizer & Phosphate Co. at Danville, Illinois, according to reports form the midwestern location. The plant, 136' x 228' in size has storage space for 7,000 tons of mixed fertilizers and for 4,000 tons of superphosphate. A production capacity of 36,000 tons per year is possessed by the phosphate unit, with an eight hour day mix capacity of 225 tons.

Designed by Chemical Engineering Service, Green Bay, Wisconsin, the building is arranged so that phosphate for mixing purposes is close to the mixing unit. Screw conveyors are installed under rail sidings so that hopper-bottom cars may be used to unload rock dust directly to the acidulating unit or the rock dust storage silo.

A unique feature of the plant is the acid and water mixer. This unit premixes acid and water automatically at the desired strength immediately before it goes into the pan. This eliminates all lead tanks, pipes and special valves as well as the necessity of maintaining a man for pre-mixing and testing the acid before using.

For the condensing of fumes, the plant has five stacks of acid protected concrete tile wherein the fumes are forced through a water bath. To the south of the plant is a large settling pond. Sulfuric acid is trucked to the plant at present, but since the fertilizer factory is located close to an acid supplier, the acid will be piped in later.

Shipping and loading operations have been worked out to the degree that a crew of eleven, including the foreman, will take care of 60 tons per hour. A conveying system is integrated into the bagging and shipp-

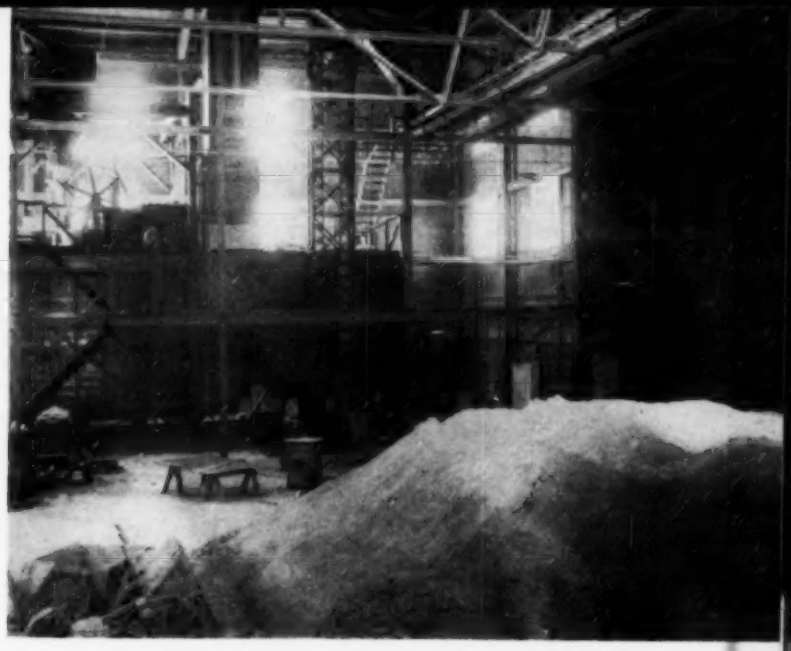
Above (left) view of plant interior, showing automatic elevator and one end of conveyor belt used to transport fertilizer materials.

Center (left): five stacks for eliminating fumes outside of plant. A settling pond is situated near by.

Below: Exterior view of Buhner plant, illustrating how railroad siding is located conveniently for loading or unloading materials.

Production

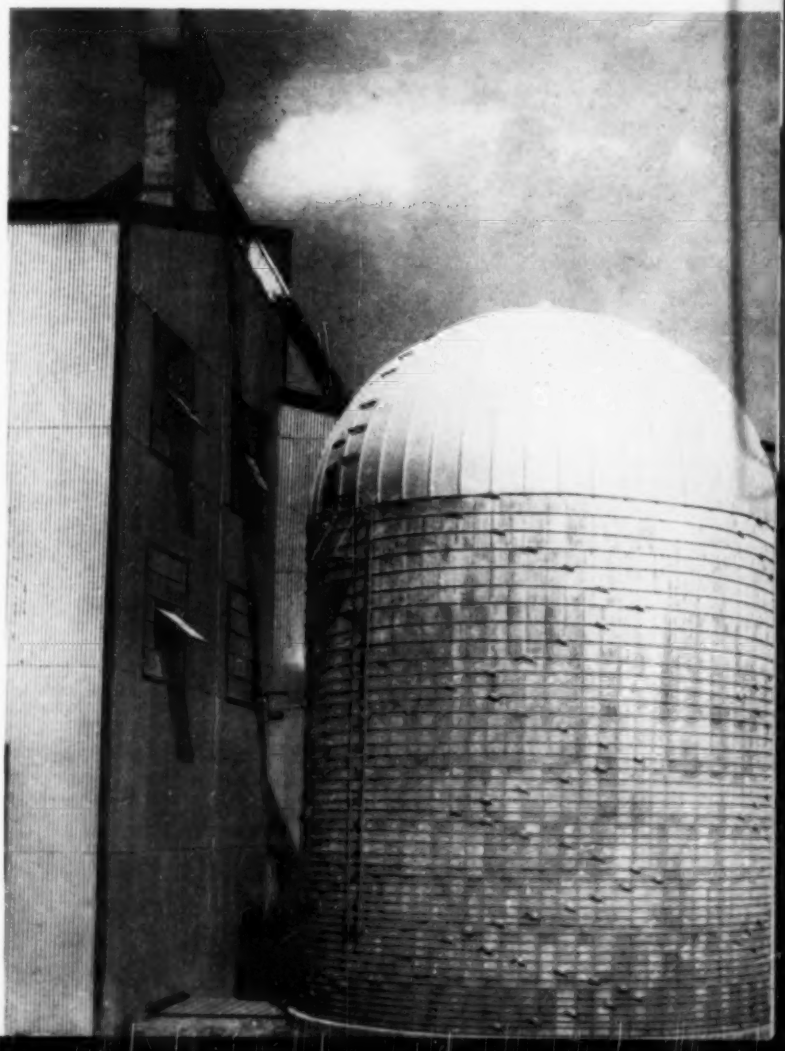
E. J. BUHNER



ing unit to move filled bags into cars or trucks. In addition to the foreman, the shipping unit employs two tractor operators, two bagger operators, a relief bagger operator, a bag supplier and four stackers.

In commenting on the operation of the new plant at Danville, Mr. Buhner has stated that if he were to re-build the plant, there are very few changes he would make, and cites particularly the acidulating unit and the Fisher-Porter system of handling and cutting acid which eliminates much of the lost motion characteristic of former methods.

In addition to its plant in Danville, the Buhner Company also operates a unit at Seymour, Indiana. The firm is one of the fertilizer pioneers of the midwest, having been in business many years.



Above: E. J. Buhner, owner of the plant which bears his name.

Above, (right) Storage space for fertilizers. Plant capacity is for 4,000 tons of superphosphate, seen here, and for 7,000 tons of mixed fertilizer which is separated in bins.

Right: Rock dust silo for storage of phosphate rock dust for acidulation plants. (All photos by Buster Crow, through Chemical Engineering service, Green Bay, Wisconsin.)

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Research Emphasized at 27th Annual Convention of

Calif. Fertilizer Assn.

A ROSTER of outstanding speakers has been arranged for the 27th annual convention of the California Fertilizer Association at the Hotel del Coronado, San Diego, Calif., Nov. 2, 3 & 4, according to Elmer S. Nelson, C.F.A. executive secretary.

Highlights of the meeting will be addresses by Dr. Paul F. Sharp, director of the Experiment Station, College of Agriculture, University of California; Dr. Russell Coleman, president of the National Fertilizer Association, Washington, D. C.; Dr. Vincent Sauchelli, Davison Chemical Corp., Baltimore, Md.; and the CFA president, J. M. Quinn, California Sun Fertilizer Co., Los Angeles.

LEMMON

ALDRICH

SHARP

Dr. Sharp will talk on the "Research Program of the College of Agriculture," the first day, and Dr. Sauchelli's topic will be "Phosphates in Agriculture." He will follow Dr. Sharp on the morning program, and Dr. Coleman will speak at luncheon. The afternoon of Nov. 2 will be devoted to official business.

Allen B. Lemmon, Chief of the State Bureau of Chemistry, is scheduled for Friday morning, November 3rd, and with Robert Z. Rollins, assistant chief, will present a "Report of the Year." They will be followed by DeWitt Bishop, district inspector, Bureau of Chemistry, Sacramento, who speaks on: "Deficient Fertilizers, the Child of Errors." Dr. W. E. Domingo, director of agronomy, The Baker Oil Company, closes the meeting with a talk and motion picture on "Castor Beans, America's New Cash Crop."

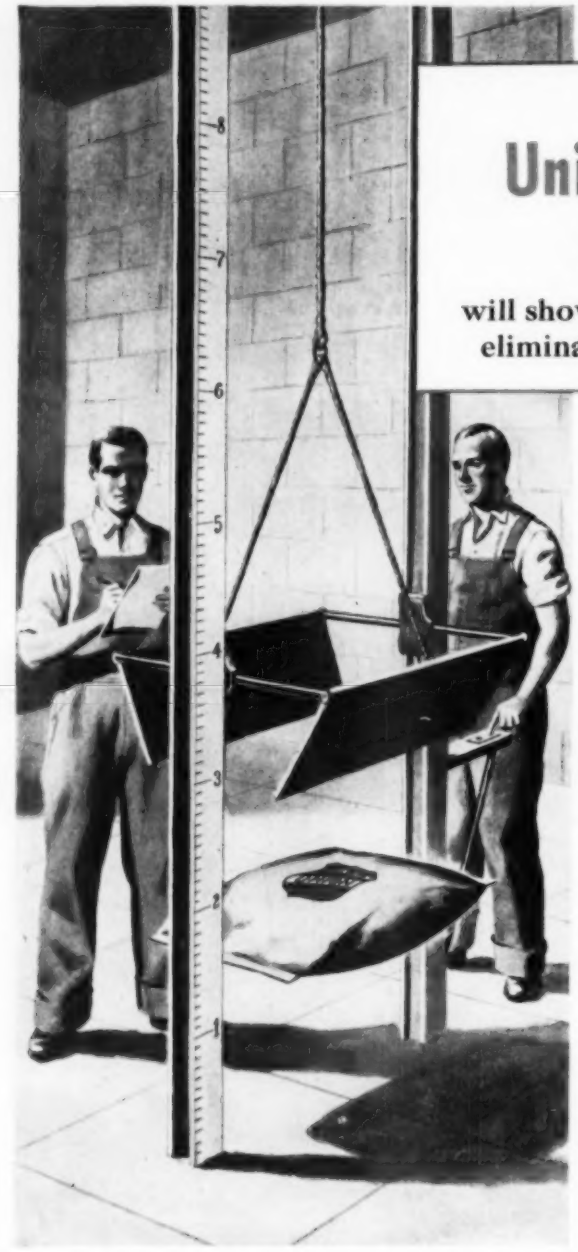
The College of Agriculture, University of California and the Soil Improvement Council of CFA are handling the afternoon session jointly. M. E. McCollam, Chairman of the Soil Improvement Committee, will open the proceedings and introduce the five participants in the afternoon program. The five include Dr. Daniel G. Aldrich, Associate Chemist, Citrus Experiment Station, Riverside, who speaks on "P and K Experiments on Citrus." J. H. Nelson, Nelson Laboratories, Stockton, "Observations on Fertilizer Use in the Stockton area." Dr. Hans Jenny, Professor of Soils, College of Agriculture, Berkeley, "The Contact Theory of Mineral Nutrition of Plants in Soils." A. H. Dill, A. B. Farquhar Company, "Precision Placement Machinery," and Dr. A. O. Lorenze, Assistant Professor Truck Crops, College of Agriculture, Davis, "Fertilizers in Irrigation Water."

PRESIDENT J. M. QUINN

The annual Association banquet will be held Friday evening. In charge of the program is Dr. Wallace Macfarlane, Pacific Guano Co., Los Angeles, and Tom Lathe, Wilson & George Meyer Co., is entertainment chairman. Officers and directors will be elected at the meeting, Mr. Nelson said. The present officers are, Mr. Quinn, president; Lowell Berry, Best Fertilizer Co., Oakland, vice-president; Grover Dunford, Inland Fertilizer Co., Los Angeles, secretary.

Directors whose three-year terms expire in 1950 are Lowell Berry, Best Fertilizers Co.; Murray C. McNeil, Swift & Co.; and Byron Reynolds, Bandini Fertilizer Co. Mr. Nelson is in charge of general arrangements.

VINCENT SAUCHELLI



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by Melvin Goldberg

Pesticide Advisory Service
New York

WHAT is likely to be the effect of recent Federal economic control legislation on the production of pesticide materials, and how will the industry be affected for the next season? These are questions uppermost in the minds of many in the industry at this time.

An attempt was made to determine what this effect will be, when curtailments of different kinds might begin to pinch, and what priority or allocation action is likely to take effect and when. To get the facts, discussions were held with industry spokesmen familiar with Federal procedures being executed at present and what plans are likely to be made; but there seems to be no definite pattern that has crystallized as of this writing.* Everything to date has been more in the "if" stage, presenting very little of anything concrete.

The initial concern felt after the seriousness of the Korean action dawned on the industry has given away somewhat to the attitude of "Let's wait and see." However, the crippling alkali-chlorine strikes and the continuing worsening benzene shortage began to have its effects during the past few weeks.

Upon settlement of the strikes affecting the chlorine industry, a general feeling of relief in the trade is apparent, but there is also concern about whether lost production time can be made up . . . a factor which will undoubtedly have its effect on next season's requirements. The benzene shortage does not appear to have any foreseeable solution within the immediate future and hence there is continuing cause for concern for those products which depend on these two vital raw materials. There have been general price increases all along the line for insecticidal raw materials and whether prices will continue to rise is unknown at this time. The threat of price control legislation is ever present but most industry spokesmen feel that there will be no action as drastic as this, certainly not until after elections and probably not until the international situation grows more serious.

Most people discount to a great extent the effect of the inventory control program that was announced by the National Production Authority the latter part of September. This regulation limits the quantity of certain materials that can be ordered, delivered and held, and limits such stocks to a "practicable working minimum." The idea behind the regulation is a good one in the opinion of industry spokesmen, but the feeling is that the carrying out of the order is practically impossible to achieve without more specific regulations.

It will be seen from the following definition why this particular regulation can hardly be enforced: A practicable minimum working inventory is defined as "the smallest quantity of material from which a person can reasonably make his deliveries or supply his service on the basis of his currently scheduled method and rate of operation." The regulation does not restrict inventories to any time period. The order applies to "everyone buying or selling either for use or for resale (including resale in export trade)." The ultimate consumer buying for personal or household use is specifically exempted. The regulation does not require users of the affected commodities to report inventories and orders unless specifically asked to do so. Only records which are normally kept of inventories, rates, deliveries and use are required to be available if the NPA asks to see them. Certain exemptions are allowed in the case of imported goods, materials normally sold only in minimum sales quantities and *seasonable industries*, providing stocks of the latter are held to normal seasonable levels. This, in the opinion of industry people, will provide adequately for the highly seasonal nature of the agricultural pesticide industry.

Chemicals which were specifically covered in the first group of products listed under this regulation which may have an effect on this industry are: industrial alcohol, benzene, caustic soda, chlorine, glycerine and soda ash. Copper and zinc are also covered by this regulation and may have some effect on the trade.

One of the more serious problems with which the industry is faced is providing sufficient amounts of toxicants for control of the cotton crop for the next season. Stocks of finished insecticides and insecticidal concentrates in the hands of manufacturers, distributors and even consumers are at a low ebb due to the unusually heavy insect infestation which visited the cotton growing areas during the past season. The 1950 crop has been officially estimated at 9,882,000 bales which compared to 16,128,000 bales last year (1949) and the ten year average of 11,599,00 bales. The 1949 carryover gives the nation about 16,600,000 bales for use in the 1950-

(Turn to Page 67)

* This article, written in the middle of September, is based on information available at that time. By the time this article appears in October, it is realized that the regulation setup may be changed.—Ed.

ACS Fertilizer

by

H. H. Slawson

OUTSTANDING advancements in the field of fertilizer chemistry, including development of a new source of fertilizer materials, new production processes and related topics were reported in sixteen papers presented at sessions of the American Chemical Society's division of fertilizer chemistry during the Society's 118th annual meeting in Chicago, Sept. 3 to 8.

In other sectional conferences some 48 papers were read dealing with agricultural control chemicals. A total of 9,000 chemists were registered at the meeting, with some 1,181 papers being read. At the Chicago Coliseum, also, manufacturers and producers of raw chemicals and chemical products, participated in the 6th National Chemical Exposition, staged by the Chicago section of the A. C. S.

In opening the first session of the Fertilizer Chemistry division, the chairman, Dr. Vincent Sauchelli, Davison Chemical Corp., Baltimore called attention to the fact that this was the division's 41st annual conference, and that this group is one of the oldest sections of the A. C. S.

The first speaker, Dr. W. H. MacIntire of the Univ. of Tennessee, spoke on "Effects of Incorporation of Certain Carriers of Fluorine Upon Its Concentration In Crops and Lysimeter Leachings."

It is only recently, Dr. MacIntire pointed out, that fluorine has been given attention in soil analysis. He described tests conducted by himself, S. H. Winterberg, L. B. Clements and Brooks Robinson to determine (1) the fluorine concentration in three crops, soybeans, lespedeza and oats, on two types of soil, a silt loam and a sandy loam, treated with various carriers of fluorine; and (2) to determine the occurrence of fluorine in rain water leachings.

There was no marked increase in plant response from any of the fluorine carriers, he stated, while rock phosphate gave less response than untreated plots. None of the added fluorides showed a depressive effect. Most significant finding was that none of the treatments caused enhancement of the fluorine content of any of the three test crops.

In the lysimeter leaching phase of the study, rock phosphate gave virtually no increase in outgo, while the other carriers showed an increase equal to about 1 percent of the 300 pounds of each carrier applied in the tests. Sodium fluoride gave the highest outgo.

"It seems strange to me," Dr. MacIntire commented, "that the fertilizer folks, all these years, have overlooked the benefits which sodium fluoride might have on their superphosphates."

It seemed logical, he summed up, that the incidence of fluorine in above ground vegetation would not be increased through the uptake from solid fluorides more than the soil would be expected to acquire from use of fluoric insecticides, from incorporation of either superphosphate or phosphate rock, or from the atmosphere.

In a second paper, immediately following, Dr MacIntire reported on early results of a study of the effects which air contamination in certain Tennessee industrial areas may have on vegetable and animal life. Farmers, he explained, have contended that their livestock show tooth, bone and degenerative effects that have been attributed to "fluorine trouble," alleged due to air contamination from aluminum manufacture.

While the study is still far from completed, he declared that his present observations do not contradict earlier conclusions to the effect that a good growth of foliage will not show a significant increase in fluorine content through uptake from the addition of solid fluorides in a soil well supplied with calcium. He added, however, that heavy inputs of hydrofluoric acid did impart an abnormal content of fluorine to red clover on two soils, both unlimed and limestoned.

Studies at the University of Illinois on the influence of silicate ions on potassium fixation by clay minerals were reported in a paper prepared jointly by Dr. M. M. Mortland and Dr. J. E. Giesking of that institution, and read by Dr. Mortland. Through X-ray diffraction studies the changes undergone by different clays were determined and it was concluded that with some clays potassium is fixed in a tenacious form.

Tomato growers fail to realize the tremendous amounts of plant food required to produce a heavy crop of high quality, Dr. Jackson B. Hester of Campbell Soup Co., Riverton, N. J., declared in an account of his company's efforts to improve the quality of their tomato purees. He told how studies had revealed that, as the grow-

Division Meets

New production processes discussed; new source for phosphate rock announced; developments in chemistry and testing of fertilizers are noted at 118th meeting.

ing season progresses, the sugar content of the tomatoes decreases, while the citric acid content, which affects the deep red color and other desirable qualities, increases, Since the citric acid is manufactured in the leaf, the problem thus becomes one of maintaining the foliage at the optimum point through use of plant food in the soil. Superior foliage was produced with a 15-10-10 fertilizer, at 1,500 lbs. per acre, in three applications and the end result had been tomatoes of the highest quality, he stated. Insect and disease control also have to be considered, he said.

A symposium on "Calcium Sulfate in Agriculture," to which Tuesday's two sessions were largely devoted, was led off by Walter S. Hamme, manager, agricultural dept., National Gypsum Co., York, Pa., who reviewed the history of gypsum, its industrial uses and commercial processing procedures.

Dr. Emil Truog, University of Wisconsin, followed with an outline survey which revealed how use of gypsum, or "landplaster," has run in cycles, whose rise or fall has depended on many factors. In looking to the future he declared that "It's hard to say what's ahead for gypsum." Decreasing use of coal, coupled with possible use of atomic energy, may reduce the air-borne sulfur which gets into the soil through rain or snow, he suggested. Should this happen generally in agricultural areas, the situation would, he ventured, present an opportunity for increased use of gypsum in agricultural fertilizers.

Dr. Sauchelli, chairman, in a paper on "Calcium Sulfate in Superphosphate; A Source of Calcium and Sulfur Nutrients," reviewed developments in nutritional science and the growing awareness that plants, animals and humans need elements formerly ignored. This, he said, has made it necessary to define more clearly the fertilizer components and has resulted in changing the concept of what a complete fertilizer should contain.

Rock phosphate, reacting to sulfuric acid, produces a mixture of phosphorus and calcium sulfate, he continued, and this latter element behaves indentically with gypsum. It has been shown that all plants contain appreciable amounts of sulfur, while calcium, also, is accepted as an important plant nutrient. If well supplied with calcium, the plant also makes better use of the nitrogen and phophorus in superphosphate, he declared.

A detailed account was presented by Omer J. Kelley of the Bureau of Plant Industry of the use of gypsum as a soil amendment for reclaiming alkali soils in western states. California, he said, is using large quantities of gypsum for this purpose, while other states, which use some could use more.

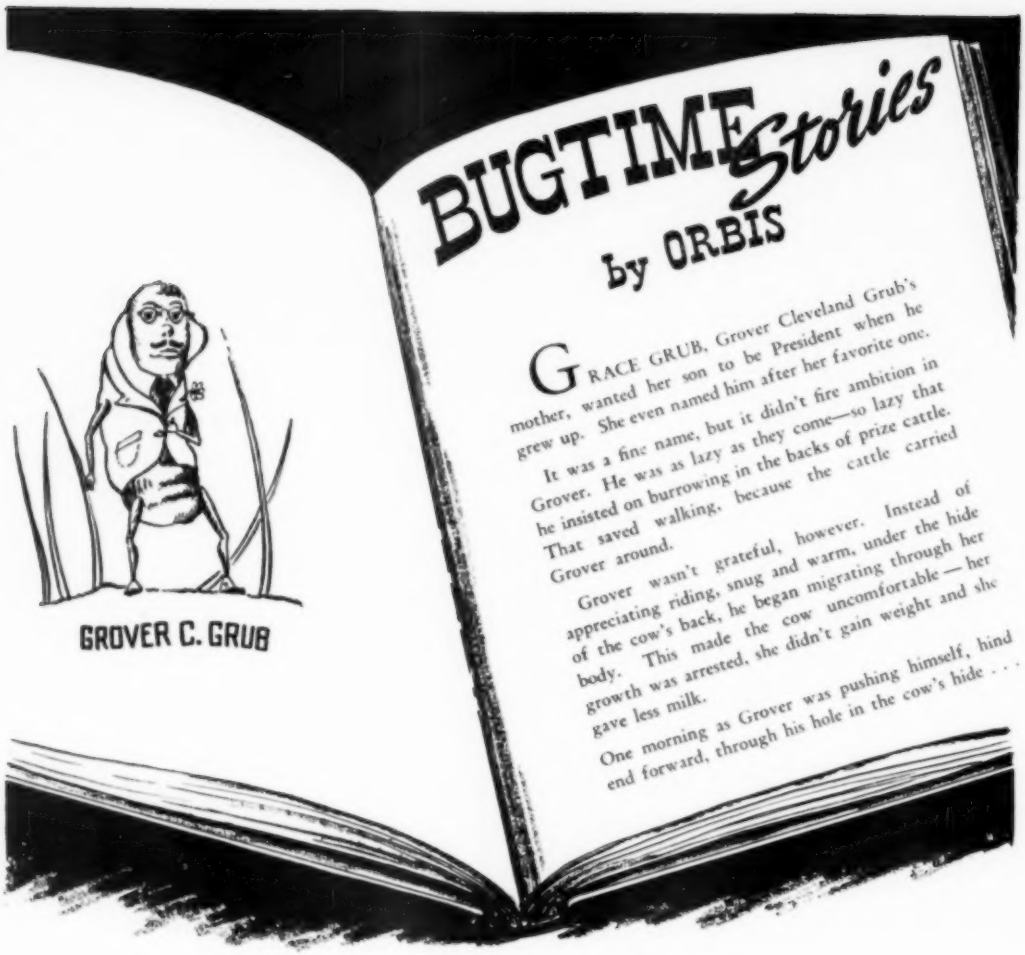
New Jersey farmers are also using gypsum in considerable quantity to improve the drainage of wet soils, Dr. J. C. Rinehart of the New Jersey Agricultural Experiment Station, reported in a paper on "Gypsum as a Soil Conditioner in Humid Regions." Some farmers, he said, have excellent results, while others obtain little benefit.

He outlined work done by himself, J. C. T. Tedrow, and F. E. Bear, to determine the conditions under which gypsum can be depended upon for excellent results. It was determined, he said, that gypsum has little effect on impervious soils or those underlaid by bed rock, but improvements can be obtained on well drained soils.

Peanut production took a long step forward, Dr. W. E. Caldwell of North Carolina State College declared, when it was discovered that plant nutrients are absorbed through the "fruit,"—the nut itself—as well as through roots of the plant. He explained the method developed by which calcium sulfate can be fed to the nut bearing runners, but not to the roots, at the critical time and in quantities which will be most beneficial for production of desirable fruit.

Nitrogen requirements of crops can now be met more economically through use of liquid ammonia than by solid fertilizers, Dr. A. L. Mehring of the USDA Bureau of Plant Industry asserted in a re-

(*Turn to Page 71*)



—he ran into an Orbis Insecticide and that was the end of Grover C. Grub!

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NFA

to discuss high analysis products at Fall meeting

DR. J. F. FUDGE

Texan to lead symposium on high analysis fertilizer materials.

DR. RUSSELL COLEMAN

National Fertilizer Association president scheduled to appear.

J. E. TOTMAN

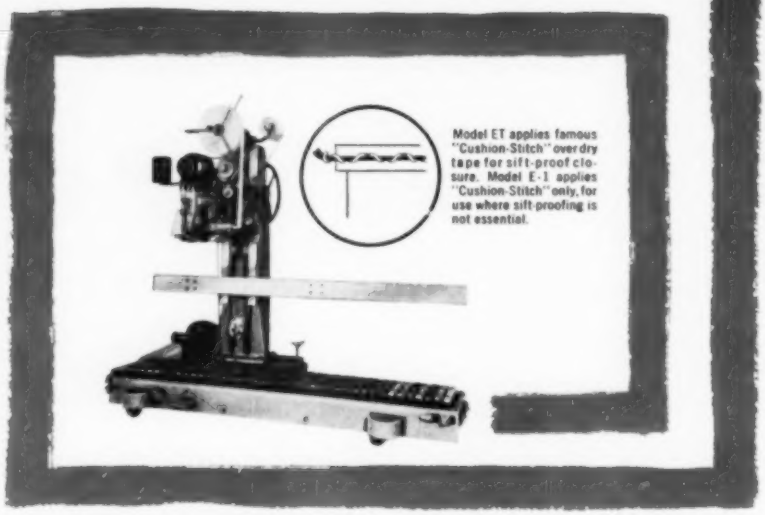
New chairman of NFA board of directors to appear on program.

THE annual fall meeting of the National Fertilizer Association is scheduled to be held at the Edgewater Gulf Hotel, Edgewater Park Mississippi, November 13, 14 & 15. The Association had not announced the full program at press time, but indicated that one of the features of the convention would be a symposium on the manufacture of high-analysis fertilizer materials. Moderator will be J. F. Fudge, College Station, Texas. with M. H. Lockwood, International Minerals & Chemical Corp., Chicago; and A. F. Miller, Swift & Co., Chicago, representing industry; and Ivan E. Miles, Mississippi State College and H. L. Dunton, V.P.I., representing the agricultural colleges.

Dr. Russell Coleman, president of the National Fertilizer Association, Washington, D. C., is scheduled to speak at the meeting, as is J. E. Totman, Baltimore, Maryland, chairman of the Association's board of directors. Committee reports will be heard, covering the Association's activities during the past months. Other speakers on the program include Norris E. Dodd, Director-General of the F.A.O., United Nations and Robert L. Humber, Greenville, N. C., attorney.

The Association anticipates a large attendance, judging from preliminary reservations. This fall meeting of 1950 is the first departure of the Association from Atlanta, Ga., for many years, it is noted.

Scene outside Edgewater Gulf Hotel, locale of the NFA's fall meeting. The establishment is near the Gulf of Mexico.



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Milestones of the Mid-Century in

Fertilizer Chemistry

by

Dr. C. E. Waring

Davison Chemical Corporation
Baltimore, Maryland

PART II

Radiosotope Tracers

THREE years ago, the phosphate Research Committee was set up, composed of representatives of industry, Federal Government Bureaus, and State Experiment Agencies to study the utilization of phosphorus on all types of soils, and in many species of plants by the radioactive tracer technique. A particular objective was to arrive at a better understanding of the benefits of phosphorus added to the soil as a commercial plant food, as contrasted to that already present in the soil.

Utilization of phosphatic fertilizer is currently not very efficient in that only about ⅓ of the available phosphates are used by the plants in the first year following application. Before this situation can be improved, it is first necessary to determine what happens to the native phosphate present in the soil and to that added as fertilizer. Past studies, depending on chemical analysis of plant tissue, were of little value in this respect since the analytical method did not distinguish between the two sources of phosphate. With the development of the tracer technique, radioisotopes of phosphorus may be incorporated in the applied phosphate and these "tagged atoms" followed throughout the growth cycle of the plant. Minute quantities of elements, beyond the scope of chemical analysis, may be detected by means of the "tagged atom" tracer method.

Although several radioactive isotopes have been used in studying the role of the major and minor elements in plant growth, radiophosphorus has been used to a greater extent than any of the others.

Studies of this nature conducted by the North Carolina Agricultural Experimental Station and the U. S. Department of Agriculture determined that there is a wide variation in the behavior of certain crops towards utilization of soil and applied phosphates. The potato plant derived as much as 60% of its phosphorus from fertilizer throughout the growing season. However, the percentage of phosphorus derived from fertilizer was high initially, for corn and soybean plants, but decreased progressively during the growing season. Possibly, this may be explained by the fact that potatoes are a short season crop with a comparatively limited root system and consequently depend to a large extent on a concentrated supply of fertilizer phosphorus. Corn, on the other hand, is a long season crop with an extensive root system and, therefore, may utilize a large quantity of soil phosphate during later stages of growth. During the early stages of growth, however, corn utilizes fertilizer phosphorus effectively. During the seedling stage of growth of corn and cotton, it was found that only a small amount of phosphorus came from fertilizer. In this case it is believed that the roots had not yet reached the fertilizer and that the plant phosphorus was being supplied from that stored in the seed.

In general it was found that the plant uptake of phosphorus from fertilizer increased with quantity of fertilizer applied and was higher throughout the season in areas where soil phosphate was at a low level.

A second phase of the tracer method is the radioautograph. The radiation of even the relatively small amount of radioisotopes absorbed by a plant in a few hours is sufficient to register on a photographic film. The distribution and concentration of radioisotopes in the plant appear on the contact print in varying intensities of light. The technique is of value to investigators of methods of tissue-testing for determination of nutrient difficiencies in plants.

The outstanding result of the radiophosphorus research so far is the convincing evidence that the crops under study—corn, tobacco, cotton, potatoes, beets—are able to utilize effectively the residual phosphorus from previous fertilization much more than previously thought. This observation justifies us in recommending that the phosphorus fertility level of all soils should be raised through generous applications of phosphate fertilizers. Little, if any, of this applied phosphorus is lost by leaching; the loss through erosion of surface soil is considerably greater. The fertilizer industry is gradually helping to increase the phosphorus fertility status of the country's soils and if the present phosphate fertilizer use is maintained in consuming areas and use is increased in newer regions, phosphorus will in time become less of a limiting factor in crop production.

(*Continued on Page* 74)

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(DDT)
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The Listening Post

This department, which reviews current plant disease and insect control problems, is a regular monthly feature of AGRICULTURAL CHEMICALS. The comments on current plant disease problems are based on observations submitted by collaborators of the Plant Disease Survey Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture, Beltsville, Md.

By Paul R. Miller

Chemicals tested for Disease Control

SAUL Rich of the Connecticut Agricultural Experiment Station reports that lettuce big-vein, a disease caused by a virus that is persistent in the soil, has become of increasing importance in Connecticut since it was first observed in 1946. Greatest loss is to head lettuce grown for the early market. Infected plants do not head until the weather becomes warm, preventing growers from taking advantage of early high prices.

Several chemicals that had previously shown some effect on the big-vein or other soil-borne viruses were tried, in a series of experiments to find some practical soil disinfection measure cheap enough to be repeated by growers every year. Table 1 gives the chemicals used, concentration and rate of application, and the results, obtained in these initial experiments.

Chlorpicrin, dichlorobutene, and xylene were applied with a hand soil-injector. Formaldehyde and ethyl alcohol were applied directly to the surface of the plots as drenches. Formaldehyde was applied in two ways: in one, the two concentrations used were applied to the entire surface of the plot; in the other, the stronger (1.6%) solution was applied to the rows before planting.

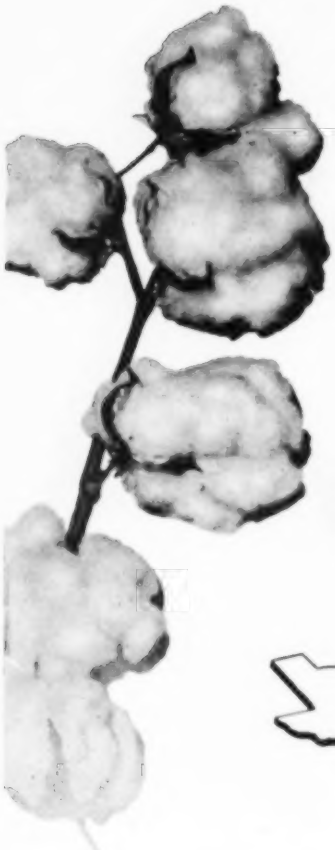
The plots (9 by 10 feet in dimension) were laid out in fields that had been infected with contaminated soil the preceding fall. The plots were treated April 21 and allowed to stand until 3-weeks old Cos lettuce seedlings were set out on May 10; 25 plants were set in each plot. To prevent reinfection after the plots were treated, no one was allowed to enter them during planting. Each person planting was required to place new paper bags over his feet as he stepped into a plot. The bags were discarded as he left the plot. Hands were washed before handling fresh plants. A separate dibble was used for each treatment. Aisles were left between the plots so that the plants could be observed without risking contamination. The plots were not cultivated.

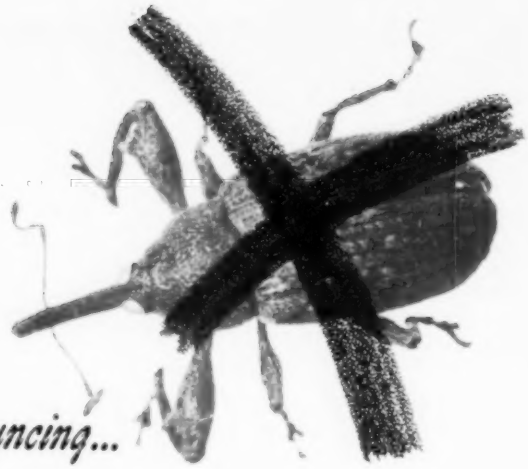
The data given in Table 1 were taken on June 16. According to the data, chlorpicrin seems to be most effective when mixed with xylene, probably because the mixture is less volatile and allows for a longer period of action. The chlorpicrin-xylene mixtures did not control weeds.

The data on the formaldhyde treatments, showing no apparent disease control, are somewhat misleading. Plants in formaldehyde-treated plots were more vigorous than check plants. Almost all of the infections in the formaldehyde plots were fairly recent at the time of data-taking, indicating that infection occurred when the roots penetrated the top few inches of soil. Because of the precautions taken against recontamination, the soil was not disturbed after treating, so that the drench treatments had to de-

Table 1.
Effects of soil treatments for the control of lettuce big-vein

Treatment	Concentration	Rate	Number of plants surviving out of 125	Number of plants diseased	Percent disease	Phytotoxicity	Amount of weeds
Chlorpicrin	Commercial strength	500 pounds per acre	112	8	7.1	None	Few
"	Cut ⅓ with xylene	"	123	5	4.1	"	Moderate to plentiful
"	Cut to ¼ with xylene	"	118	3	2.5	"	Plentiful
Formaldehyde	0.8%	1 qt. per sq. ft.	124	6	4.8	"	Moderate
"	1.6%	"	124	9	7.3	"	Few to moderate
"	1.6%	" (in rows)	125	7	5.6	"	Few where treated plentiful otherwise.
Ethyl alcohol	30%	1 qt. per sq. ft.	124	3	2.4	Severe stunt and yellowing	Few
Dichlorobutene	Commercial strength	400 lbs. per acre	94	1	1.1	Stunting and yellowing	Moderate
Xylene check	Technical	400 lbs. per acre	125	7	5.6	Slight stunting	Moderate to plentiful
Untreated check	———	———	125	7	5.6		Plentiful





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pend on percolation for vertical penetration.

The most promising treatments, it is concluded, are a mixture of chlorpicrin and xylene (1.3), formaldehyde at 1.6% (one gallon commercial formaldehyde solution in 50 gallons of water), dichlorobutene, ethyl alcohol (30%). The latter two materials were too toxic to lettuce to be used as a spring treatment; they could perhaps be valuable as fall treatments. Ethyl alcohol may be eliminated as a practical treatment because of the difficulties of obtaining the material. Chlorpicrin at one-quarter commercial strength with xylene may be cheap enough to offer most promise. As noted, formaldehyde is very promising in spite of the recorded data, but drenches have the disadvantage of puddling the soil and thereby ruining soil texture. Formaldehyde may best be applied as a dust, using some organic material such as ground oat hulls or sawdust as a carrier; used in this way the materials would not only help control big-vein and reduce weeds, but would at the same time serve to improve soil texture and control damping off fungi.

Seed Treatment in Oats, Wheat

BENJAMIN Koehler and W. M. Bever of the University of Illinois report experiments in 1950. The results indicated that "Ceresan M" is slightly less damaging to seed than "N. I. Ceresan" under the same conditions. Both are sufficiently volatile so that action goes on during a considerable period of time in storage before planting and both give excellent smut control. "Panogen" also has given good smut control and appears to be an excellent seed treating compound from the standpoint of safety to the treated seed. Unfortunately, there does not yet appear to be any satisfactory method for applying "Panogen" on a commercial scale.

In the experiments, treatments were made by the dry method except with "Panogen" which is a liquid. With "Panogen," the liquid was added to the walls of a bottle with a measuring pipette while the bottle was rolled; the seed was then added and the bottle thoroughly shaken. All treated seed was stored in closed screwtop bottles, except that seed treated with "Panogen" was left open during the first 24 hours. It is impossible to simulate all storage conditions on farms or at seed houses because they vary so greatly. Closed bottles simulate conditions where treated seed is stored in large bulk. A treatment that causes no damage in closed containers would seem to be safe under any storage conditions with similar seed.

In the tests for the control of smut in oats, treated smut-infected oat seed variety Canadian, were planted in rod rows in triplicate. Results are given in Table 2. A high percentage of smut developed in the checks. The two "Ceresans" gave good con-

Table 2.

—Smut in Canadian oats when treated with seven different compounds at several dosages and at three time intervals before planting: Urbana, Illinois, 1950

Treatment	Dosage	Number of smutted heads when treated seed had been stored in closed bottles before handling		
		4 weeks	1 week	1 day
	oz. per bu.	%	%	%
N. I. Ceresan[a]	¼	0	0	.7
N. I. Ceresan	⅜	0	0	.8
N. I. Ceresan	½	0	0	0
Ceresan M[b]	¼	0	0	2.4
Ceresan M	⅜	0	0	.9
Ceresan M	½	0	0	.6
Parson's Seed Saver Dust[c]	¼	33.9	....	....
Parson's Seed Saver Dust	⅜	30.1	....	....
Parson's Seed Saver Dust	½	29.4	30.5	29.8
Parson's Seed Saver Dust	⅜	....	26.6	26.7
Parson's Seed Saver Dust	1	....	21.7	23.2
Panogen[d]	⅜	.1	....	....
Panogen	½	0	....	....
Panogen	¾	0	0	0
Panogen	1	....	0	0
Panogen	1½	....	0	0
Carbide and Carbon #5837[e]	½	....	....	15.4
Carbide and Carbon #5837	1	....	....	.4
Dynacide[f]	½	....	....	7.6
Dynacide	1	....	....	4.6
U. of Del. #467[g]	½	....	....	4.0
No Treatment, percent smut	38.8			

[a]Ethyl mercury phosphate, 5 percent.
[b]Ethyl mercury p-toluene sulfonanilide, 7.7 percent.
[c]Organic and inorganic mercury cpds, 3.8 percent metallic mercury.
[d]Methyl mercury dicyan diamide, 2.1 percent.
[e]Dibromobutane
[f]Phenyl mercury acetate, 5 percent.
[g]Ethyl mercuric perthiocyanate, 10 percent.

Table 3.

—Percent germination in Pawnee and Royal Winter wheat when the seed was treated with normal and excess amounts of three seed disinfectants: Urbana, Illinois, 1950

Treatment	Dosage	Stand of Wheat			
		Pawnee		Royal	
		Planted after 3 months storage	Planted after 1 day storage	Planted after 3 months storage	Planted after 1 day storage
	oz. per bu.	%	%	%	%
N. I. Ceresan	½ (normal)	78.3	86.0	81.3	91.3
N. I. Ceresan	1	53.3	.....	54.7	.....
N. I. Ceresan	2	40.6	.....	38.7	.....
Ceresan M	½	82.7	90.3	86.3	91.7
Ceresan M	1	63.3	.....	65.7	.....
Ceresan M	2	46.0	.....	50.3	.....
Panogen	¾	87.7	84.7	86.3	90.0
Panogen	1½	83.0	.....	88.0	.....
Panogen	3	50.7	.....	53.0	.....
Check	——	.....	85.0	.....	88.7

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trol at ¼ ounce per bushel when the seed had been treated a week before planting. "Parson's Seed Saver Dust," of which some commercial sales were made in Illinois in 1950 and some previous years, gave no control. Treatments with "Panogen" gave good results in this test, but "Panogen" used on a commercial scale gave poor results. "Carbon and Carbide No. 5837" gave fair control at one ounce per bushel, while some other compounds (Table 2) did not give adequate control.

Vigor notes were made at several intervals while the plants were developing. "N. I. Ceresan" at ½ ounce per bushel, four weeks storage, gave a distinct retardation in growth heading. Less dosage avoided this which carried through to delayed damage and also gave perfect smut control. "Ceresan M" showed this retardation effect to a much less extent. The most vigorous score was attained by "Panogen." It was best at ½ and 3.4 ounce, four weeks storage, and

(*Turn to Page 69*)

U. S. Insect Conditions During September

This column, reviewing current insect control programs, is a regular feature of AGRICULTURAL CHEMICALS. Dr. Haeussler is in charge of Insect Pest Survey and Information, Agric. Research Adm., B. E. & P. Q., U.S.D.A. His observations are based on latest reports from collaborators in the department's country-wide pest surveys.

By G. J. Haeussler

Vegetable Insects

INFESTATIONS of the Mexican bean beetle remained generally moderate to heavy throughout August and the first half of September in Atlantic Coast and Gulf districts, as well as in parts of Tennessee and Ohio. Infestations of somewhat lesser intensity were reported from Nebraska, Wyoming, and Colorado. The potato leafhopper was troublesome on beans over a wide area, including parts of New York, Delaware, Maryland, Virginia, North Carolina, Tennessee, Ohio, and Wisconsin. Lygus bugs caused serious damage to beans in Southern California. Other pests reported troublesome on beans in that area included the bean aphid, two-spotted spider mite, corn earworm, lima-bean pod borer, and onion thrips. The two-spotted spider mite also caused some damage to beans in Delaware and Idaho, and caused moderate to heavy damage to that crop in central Washington. Toward the middle of September the bean leaf beetle was causing considerable damage to beans in Virgina and lighter damage in Louisiana. Heavy infestations of the banded cucumber beetle occurred in beans in the latter State, and moderate infestations of that insect were reported from South Carolina and Florida.

Cabbage caterpillars continued numerous throughout August and the first half of September on various cole crops in parts of many states in the East and in the South. During early September the harlequin bug occurred in light to moderate numbers on crucifers in Virginia, Georgia, and Louisiana and caused serious damage in parts of Tennessee. The southern green stink bug was numerous on collards in Georgia and Florida, the vegetable weevil was injuring turnips seriously in Georgia, and cabbage aphid infestations were moderate to heavy on cole crops in Southern California.

Aphid populations on potato were on the increase in Maine during most of August and in some instances high populations of the potato aphid required special insecticide treatment in some commercial fields. By early September aphid infestations had decreased sharply on potato in Maine, but were on the increase on that crop in Wisconsin and Washington.

Aphids were numerous during August on tomato in Maryland, Ohio, Alabama, and Tennessee. Around the middle and latter part of that month high aphid populations were reported on pepper in Delaware and California and on hops in Idaho. They were still abundant on tomato in Tennessee, Ohio and some parts of Southern California early in September.

Hornworms damaged tomato in a number of states during August, including parts of Delaware, Maryland, South Carolina, Alabama, and California, and infestations persisted on that crop in Maryland and Virginia during the first half of September. The tomato fruitworm was troublesome on that crop during August in parts of Maryland, Tennessee, South Carolina, Alabama, and Mississippi.

Although aphids persisted on late tobacco in most areas reporting, they apparently did not cause any great damage during August and early September. Hornworms and the budworm were reported on late tobacco from several areas, including Maryland, South Carolina, Georgia, Florida, and Tennessee, but no very serious damage was reported.

Cotton Insects

THE insect situation continued to cause grave concern to cotton growers throughout August and the first half of September. The boll weevil continued to increase rapidly in abundance in many areas and thousands of growers were still spraying or dusting to hold down the damage. Reports early in August indicated that weevil damage was greater than at that same time last year in Texas, Oklahoma, Louisiana, Arkansas, Missouri, Tennessee, Virginia, and North Carolina. Although weevils were apparently being held in check better than last year in parts of South Carolina, Georgia, Alabama, and Mississippi, a continued fight was essential to keep the pest in check. The cotton leafworm also continued to spread and added to the seriousness of the situation.

County agents, entomologists, and insecticide manufacturers and distributors did everything possible to

(*Turn to Page 67*)

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Suppliers' Bulletins

Parathion Label Claims

American Cyanamid Co., New York, makers of parathion, have released a bulletin on the wording of claims for labels acceptable to the U. S. Department of Agriculture, on parathion products. It divides the material into wettable powder sprays and dusts, and presents the copy for labels giving instructions for use on fruits & nuts; vegetables, forage crops, ornamentals, and field crops. The claims listed in the folder are more comprehensive and cover more ground than any published heretofore, the company states. Copies are available from the Agricultural Chemicals Division, American Cyanamid Co., 30 Rockefeller Plaza, New York 20.

•

Synthetic Organics Booklet

Carbide & Carbon Chemicals Division, Union Carbide & Carbon Corp., New York, has issued the 1951 edition of the 16-page booklet, "The Physical Properties of Synthetic Organic Chemicals." It is condensed as a guide for users of organic chemicals, presenting data on applications and physical properties of more than 250 synthetic organic chemicals in tabular form. Copies are available from the company, 30 E. 42nd St., New York 17, N. Y. Ask for form 6136.

•

Intl. Minerals Report

The 41st annual report of International Minerals & Chemical Corp. has been issued by the company in an attractive full-color booklet presenting the firm's 1950 activities. Net income for the fiscal year ended June 30, 1950, was $5,776,660 as compared with $5,421,017 the previous year, the report states.

•

Sanitary Pump Bulletin

Waterous Company, St. Paul, Minn. has prepared a new bulletin describing its line of sanitary pumps with capacities ranging from 1 to 25 gallons per minute and pressures up to 125 pounds. The equipment is engineered for use in pumping chemicals at high or low temperatures, either under pressure or vacuum, where the materials must be handled on a sanitary basis. Write for bulletin P-332, Waterous Company, 80 E. Fillmore Ave., St. Paul 1, Minn.

•

Warfarin Bulletins Out

New information folders on the rodenticide warfarin have been released by the Wisconsin Alumni Research Foundation, Madison, Wis. The folder describes the anti-coagulant action of the material, pictures of its discoverers at the Wisconsin laboratories, and instructions for baiting for best results.

Another poster, 18 x 24½ inches in size, has been issued by the Foundation for use in publicizing warfarin. Its copy reads, "Stop this robber!" with a picture of a rat's head in the center. Copies are available. Write the Wisconsin Alumni Research Foundation, University of Wisconsin, Madison.

•

Mixing Systems Described

Chemical Engineering Service, Inc., Green Bay, Wisconsin, has issued a 24-page booklet describing in detail the mechanics and economics of their line of "COE" hoppers and mixing systems. A cut-away drawing of the fully-automatic system is presented, with full descriptive details. Write for booklet entitled "The Picture of Profits and Costs has Changed."

•

Sulphur Up $4 Per Ton

Freeport Sulphur Co. announced an advance of $4.00 per ton in the price of sulphur early this month, bringing the price for domestic delivery to $22 per ton. Sulphur for export was advanced $3 per ton, up to $25. Sulphur shipments have been running in excess of production and users are urged to conserve stocks. Texas Gulf Sulphur Co. is expected to move its price schedules upward, in contracting for 1951 delivery. Texas Gulf has indicated it will allocate sulphur shipments over the balance of 1950, reducing quantities shipped about 20%.

•

Offers Mixer Bulletin

U. S. Stoneware Co., Akron, Ohio, has issued bulletin 265 describing its line of mixing and grinding equipment. The bulletin is fully illustrated and each item is described fully. Write the company, c/o Process Equipment Div., Akron 9, Ohio.

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Offers Laboratory Service

Raymond C. Crippen Laboratories, Baltimore, Md., have issued bulletin 27, entitled "Organic Syntheses, Research, Development & Analyses." The literature describes the services available in the fields mentioned, and also in the development of new compounds into new uses. Write the Crippen Laboratories, Fleet St. & Central Ave., Baltimore 2, Maryland.

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Kraft Bag Brochure Out

Kraft Bag Co. has just published a brochure entitled "Dependable," describing the various types of shipping sacks the company manufactures at its two plants at St. Marys, Ga. and Gilman, Vt. Copies of the colorful brochure are available from the company, 630 Fifth Ave., New York 20, N. Y.

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Technical Bulletin Offered

Pittsburgh Agricultural Chemical Co., New York, has prepared a technical bulletin describing the chemical properties, insecticidal efficiency and toxicity of "Metacide," "Systox" and "Potasan," three new organic phosphate insecticides offered by the company.

"Metacide" has insecticidal strength equal to parathion, but less toxicity to mammals, the book indicates. "Systox" is a systemic, for research only. "Potasan," a miticide, is available for research in spray or dust form. Write for bulletin, c/o the company, 650-A Empire State Bldg., New York 1, N. Y.

MATHIESON AGRICULTURAL SULPHURS

Dusting Sulphur

Conditioned and unconditioned—93% passing No. 325 Mesh or 98% passing No. 325 Mesh. These Dusting Sulphurs are very finely ground and specially processed to resist lumping or caking when stored.

Wettable Sulphurs

Fungicidal Sulphur, minus 10 microns, or 98% passing No. 325 Mesh. These Wettable Sulphurs contain efficient wetting and dispersing agents which make the Sulphurs readily miscible with water for use in orchards or in the preparation of cattle and sheep dips.

Soil Sulphurs

Granular—16 Mesh. Mathieson Soil Sulphur is an efficient acid medium for neutralizing or acidifying alkaline soils and for adding porosity to dense soils.

Commercial Flour Sulphur

99.5% Pure. 90% passing No. 80 Mesh. Specially refined for use in mixed fertilizers and in mineral feed mixtures for live-stock.

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Mathieson
CHEMICALS

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SERVING INDUSTRY, AGRICULTURE AND PUBLIC HEALTH

Technical Briefs

DDT Solvents Evaluated

During the summer of 1949 DDT emlusion and solution sprays containing different solvents were tested on the foliage of numerous field crops at Long Beach, Miss., and Atmore, Ala. Four applications at dosages of 1 to 2 pounds of DDT per acre were made to determine the most satisfactory solvent for use in white-fringed beetle control. Of eight solvents used, "Amsco-Solv A" was the most satisfactory, closely followed by xylene. In general, the kerosene formulas, both emulsions and solutions, caused excessive foliage burn. The foliage of sweet-potatoes and peanuts were least affected. None of the sprays, at the dosages employed, affected the yield of snap beans or tomatoes, but there were indications that formulations containing kerosene would adversely affect the yield of squash.

Tests were also conducted in 1949 to determine the effect of DDT-xylene emulsion on the foliage of nursery plants. From one to seven applications were made during the summer with 1 to 10 pounds of DDT (1 to 10 quarts of xylene) per acre-application, or a total of 7 to 30 pounds of DDT (7 to 30 quarts of xylene) per acre-season. There was no evidence of foliage burn or indication that bud formation or new growth had been affected.

In 1946, because of its availability and comparative low cost, xylene was the only solvent used in DDT-emulsion formulations for additional tests and for field control against adult white-fringed beetles. Emulsion sprays were applied at rates up to 10 pounds of DDT (10 quarts of xylene) per acre-season to the foliage of field crops and ornamentals, and the results were entirely satisfactory.

In 1948, tests conducted on potted bean plants and field-grown beans and peas showed that either coal-tar or petroleum xylene is satisfactory for use in white-fringed beetle control.—U. S. D. A. Bulletin E-806, July, 1950.

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Trace 2,4-D Radioactively

"Tagging" 2,4-D with radioactive carbon, scientists at the New York State Experiment Station, Geneva, have been able to trace minute amounts of this weed killer as it passes through bean plants.

The investigations are part of a study of plant growth regulators under way at the Station. 2,4-D made radioactive by the addition of carbon -14 in the carboxyl group was applied to young red kidney bean plants and the absorption of the 2,4-D by the plants traced with the aid of a Geiger counter. While beans would never be treated with 2,4-D as a regular practice, they served as an excellent experimental medium.

Methods were also devised which make it possible to isolate and measure nearly all of the radioactive material present in the stems of treated plants.

"Minute quantities of 2,4-D are sufficent to kill sensitive plants, but these quantities cannot be followed in the plant by ordinary analytical methods," the Station reports. "Radioactive carbon has been used to 'tag' the 2,4-D and in this way it has been possible to detect amounts of the 'tagged' weed killer as little as one-billionth of an ounce or less. The movement of the 2,4-D in the bean plant has also been studied, and some information obtained concerning the chemical changes of 2,4-D that take place in plants."

The chief movement of radioactive 2,4-D applied to the leaves was downward through the stems of the bean plants, eventually reaching the roots. The major portion of the radioactivity was concentrated in the stems. Considerable movement of the material had occurred within six hours after treatment, it was found.

Grasshopper Control Noted

Satisfactory control of grasshoppers in short, green alfalfa was obtained with the following insecticides and minimum acre-dosages: Chlordane spray 0.5 pound, dust 1 pound; toxaphene spray 1 pound, dust 1.5 pounds; aldrin spray 0.125 pound, dust 0.25 pound; parathion suspension spray 0.2 pound, dust 0.3 pound. Kills at these dosages approximated 90 percent in 3 days.

To secure control in tall, dense alfalfa, weedy grain stubble, and drying grass it was necessary to use the following dosages: Chlordane spray 1 pound, dust 1.5 pounds; toxaphene spray 1.5 pounds, dust 2 pounds; parathion spray and dust 0.4 pound; aldrin spray 0.25 pound; dust 0.4. Oil solution, emulsion, and water-suspension formulations of chlordane, toxaphene, and aldrin were about equally effective.

Dieldrin, heptachlor, and tetraethyl pyrophosphate used at 0.1 pound per acre were equally effective against grasshoppers in range grass. Kills ranged from 80 to 90 percent.

Benzene hexachloride was used at 0.4 pound of the gamma isomer in emulsion spray and dust. Kills were occasionally good but usually poor. All insecticides were less effective when applied to mature or dry vegetation during the summer, than when used on succulent vegetation in the spring or fall.

Residual kills with chlordane, toxaphene, aldrin, dieldrin, and heptachlor continued for 1 to 3 weeks; residual kills with benzene hexachloride, parathion, and tetraethyl pyrophosphate after one day were of no consequence as compared with 1 day for tetraethyl pyrophospate and 5 days for benzene hexachloride and parathion.

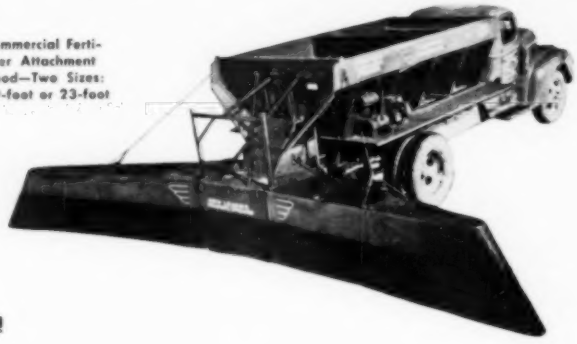
The following bait toxicants and minimum rates per 100 pounds of carrier gave as good and usually much higher kills in field tests than 6 pounds of sodium fluosilicate: Chlordane 0.5 pound, toxaphene 1 pound, aldrin, dieldrin, and heptachlor 0.1 pound, and benzene hexachloride at 0.25 pound of the gamma isomer.

Toxicants in oil solution, emul-

HERE'S THE ANSWER TO YOUR SPREADING PROBLEMS!

AGAIN! "The NEW LEADER" leads the field

with its new motor-driven Spreader offering greater accuracy of spread with the most positive feed on the market!



Commercial Fertilizer Attachment Hood—Two Sizes: 19-foot or 23-foot

SPECIAL ADVANTAGES — Uniformity of spread is not dependent on truck speed. Motor is mounted on catwalk and drives only the twin distributor discs at a constant speed, assuring full width of spread at all times together with uniform distribution.

Conveyor is separately driven from truck drive shaft by a series of V-belts to deliver the correct amount per acre—regardless of truck speed or regardless of whether the truck is driven in low, super-low or any other gear.

Conveyor speed is, therefore, positively synchronized with speed of the rear wheels of the truck and at each revolution of the rear wheels, the conveyor moves a given distance regardless of the truck's speed. Amount of material delivered by conveyor does not vary with hilly or soft field conditions.

Spreader Body Lengths (inside measure) are 9′, 11′, 13′ and 15′. Other body lengths on special order.

Note: When Spreading Attachment is folded up for road-traveling position—width is approximately 7′-5″.

"The NEW LEADER" Self-Unloading Bulk Transport

Size above, 30-foot length (exclusive of elevator), total capacity 23.7 cu. yds. Conveyor and elevator driven by gas engine. Available in other sizes from 15-ft. to 30-ft.

Special Feature: Transport is a self-powered unit. A 13 H.P., air-cooled gas engine operates conveyor and elevator independently of truck power when unloading at plant or filling trucks at delivery points.

Suitable for hauling bulk material such as lime, commercial fertilizer, rock phosphate, sand, crushed rock, coal, corn, grain, feeds, etc. Adaptable to hauling bagged, packaged goods, etc.

Write today for specifications.

HIGHWAY EQUIPMENT COMPANY, INC. CEDAR RAPIDS, IOWA

MANUFACTURERS OF THE WORLD'S MOST COMPLETE LINE OF SPREADERS

sion, and water suspension showed no consistent outstanding differences in kills. Toxicants in oil solutions were the easiest to use in making dry baits; emulsions were more convenient for making wet bait.

The following baits containing chlorinated hydrocarbons were more effective than wet bait with sodium fluosilicate as the toxicant: Mixture of mill-run bran and sawdust moistened with water containing the toxicant in emulsion or water suspension and applied wet; coarse bran impregnated with the toxicant in oil solution plus an equal volume of sawdust, water to make a crumbly mash, and applied wet; coarse bran impregnated with the toxicant in oil solution, and applied dry. The dry bait is easier to prepare, can be stored for months without loss of effectiveness, and is particularly well suited for distribution by aircraft because the acre-rate of application is only one-fourth the weight of wet bait containing the same quantities of bran and toxicant.

Increasing acre-rates of bait application from 5 to 10 pounds with dry bait and from 20 to 40 pounds with wet bait did not consistently increase the kills with the grasshopper populations (10-50 per square yard) encountered in the tests. Experience gained in range grasshopper control programs indicated that more than 5 pounds of dry bait is needed to control populations exceeding 50 per square yard.

The relative effectiveness of morning and afternoon bait applications in alfalfa varied with the seasons of the year but differences were not great enough to warrant limiting operations to any particular time of day.

Most species of grasshoppers ate impregnated dry bran readily but some range species fed on it only sparingly and a few not at all. Species that accepted the bait readily ate from 1 to 38 flakes at one feeding although only 1 flake was needed to kill. Increasing the toxicant to four times the minimum effective dosage did not decrease the number of flakes eaten.—U. S. D. A. Bulletin E-807, "Tests of Insecticides for Grasshopper Control, 1948 and 1949," by J. R. Parker. July, 1950.

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Toxicants Tested in Foods

Known amounts of spray residues of ten insecticides were bioassayed in processed foods (strained beans, and mixtures of apricots and apples) by a modified Nolan and Wilcoxon method for parathion, involving the extraction of the insecticide from the food product with benzene, evaporating the benzene with compressed air, and testing the extract in water on *Aedes aegypti* mosquito larvae for toxicity.

The insecticides assayed by this method were heptachlor, aldrin, dieldrin, chlordane, lindane, BNP, BNB, methoxychlor, "Rhothane," and toxaphene.

The various insecticides were readily detected when added to processed foods at concentrations of 0.5 to 5.0 p.p.m. Benzene extracts of such samples were diluted to a dosage equivalent to 0.01 to 1.0 p.p.m. for critical assaying. The critical dilution of extracts from aqueous suspensions was to a concentration of 0.125 to 0.01 p.p.m.

In general, the insecticide toxicity was inhibited when combined with plant material. Strained beans inhibited toxicity to some insecticides more than a mixture of strained apricots and apples.

Heptachlor in both beans and apricots and apples, and methoxychlor and chlordane in beans showed partial destruction in processing.—"Bioassay of Insecticide Spray Residues in Processed Food," by Albert Hartzell and Eleanor E. Storrs in *Contributions from Boyce Thompson Institute*, April-June, 1950.

•

Oil Herbicides Tested

Tests were conducted to evaluate the toxicity of 31 pure petroleum hydrocarbons in the boiling range from 176 to 572° F. Selectivity was studied as a property of oils and as a characteristic of plants. Methods were studied by which toxic hydrocarbons and herbicidal oils could be made selectively toxic. Test plants used were carrots, several other vegetable species, and weeds.

The results of the evaluation of the hydrocarbons indicated the order of toxicity from highest to lowest to be aromatics, naphthenes, olefins, and straight-chain paraffins. Boiling point influenced toxicity independently of hydrocarbon series. In general, the boiling range of greatest toxicity was about 280 to 510° F. The hydrocarbons with a boiling range less than that were low in toxicity, probably because of their high volatility. Chronic injury resulted from hydrocarbons boiling above 510°F. The most extreme variation in toxicity was found in the boiling range from 400 to 510° F. The aromatics, methyl-naphthalene, dimethyl-naphthalene, and diphenyl-methane, were the most toxic hydrocarbons tested; yet n-tetradecane in the same boiling range did not injure any of the test plants.

A peculiar characteristic of the olefins was their marked increase in toxicity on being stored in the light. Such a change did not occur in the aromatics or paraffins.

One method used in evaluating the toxicity of the hydrocarbons was to dilute them in a nontoxic oil to a concentration that was not toxic to carrots, but toxic to most other kinds of plants. Such selective concentrations were obtained for the toxic hydrocarbons that had boiling points between 280 and 500° F.

The results of several experiments in which the hydrocarbons were diluted in nontoxic oil gave strong evidence that the selective toxicity of aromatic hydrocarbons depends on their concentration rather than on the quantity applied. This is in contrast to certain other herbicides, such as the growth-regulating materials, where the quantity of toxicant applied is more important than its concentration.

Experiments with aqueous emulsions of toxic hydrocarbons and highly aromatic naphthas indicated that it was possible to obtain selectivity by this form of application. Results with emulsions, however, were not consistent. Diethyl-benzene at 30

(*Turn to Page 67*)

Horseflies

Stable flies

Horn flies

Deer flies

Houseflies

Mosquitoes

WHICH DAIRY INSECTICIDES Kill 'em All YET WON'T CONTAMINATE MILK?

Answer: *Pyrenone-based insecticides.* They're the *only* insecticides that protect cattle against all the pests shown here. They will not contaminate milk or meat . . . are free from skin irritants and unpleasant odors.

Give *your* dairy insecticides these sale "pluses." Base them on Pyrenones and cash in on the hard-selling nationwide advertising, publicity, and promotion campaigns that are keeping Pyrenone-based insecticides *first* in the minds of *your* customer – the dairy farmer.

For information, write U. S. Industrial Chemicals, Inc., 60 East 42nd Street, New York 17, New York.

Branches in all principal cities

In Canada: Standard Chemical Co., Ltd., 99 Vanderhoof Ave., Leaside, Toronto, Ontario.

Pyrenone*

*Registered U. S. Patent Office

INDUSTRY NEWS

Witman to Pitts. Plate Glass

E. D. Witman has joined the Market Research and Development Department of Pittsburgh Plate Glass Company's Columbia Chemical Division, according to an announcement by W. I. Galliher, executive sales manager for the division.

E. D. WITMAN

Formerly associated with Sherwin-Williams Company as assistant director, Agricultural Chemicals Division, Mr. Witman will specialize in agricultural chemicals with Columbia. He is a native of New Albany, Indiana, and received his Doctor's degree in Chemistry from Ohio State University.

Dr. Witman is a member of the research committee, North Central Weed Control Conference; member of the American Chemical Society; and served as special consultant for the office of Scientific Research and Development in World War II.

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Prentiss Changes Name

R. J. Prentiss & Co., Inc., New York 7, N. Y., for over 40 years a key figure in the manufacture and distribution of chemicals, botanicals, insecticides and rodenticides, has changed its corporate name to Prentiss Drug & Chemical Co., Inc., as of October 1, 1950, it has been announced by Harold R. King, president. According to King, this is merely a change in corporate name and does not involve any change in business policy, management or personnel.

At the same time, Mr. King

(*Turn to Page 66*)

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Putnam Joins Ultra Chem.

Sherman W. Putnam has been appointed general sales manager, in the Midwest for all products of Ultra Chemical Works, Inc., it has been announced. Mr. Putnam will operate from Ultra's new Midwest Sales Office, in Chicago. He was formerly assistant general sales manager of Dow Chemical Co.

MEETINGS

National Pest Control Association, Netherland-Plaza Hotel, Cincinnati, Ohio, October 22-25.

12th Annual Packaging Institute, Hotel Commodore, New York City, October 23-25.

Mississippi Fertilizer Conference, Buena Vista Hotel, Biloxi, Miss., Oct. 26 & 27.

2nd Annual Aerial Dusting & Spraying Conference, Yakima, Washington, Nov. 2 & 3.

California Fertilizer Association, Coronado Hotel, San Diego, Calif., November 2-4.

National Fertilizer Association, Edgewater Gulf Hotel, Edgewater Park, Mississippi, November 13-15.

N. Y. State Insecticide & Fungicide Conference, Ithaca, N. Y., November, 14-16.

Eastern Branch, American Association of Economic Entomologists, Warwick Hotel, Philadelphia, Pa., Nov. 20 & 21.

4th Western Canadian Weed Control Conference, Regina Sask., Canada, Nov. 21 & 22.

American Phytopathological Society Peabody Hotel, Memphis, Tenn., Dec. 1, 2, 3, 1950.

Chemical Specialties Mfgrs. Association, New Yorker Hotel, New York, Dec. 4 & 5.

North Central Weed Control Conference, Milwaukee, Wisconsin, December 12-14.

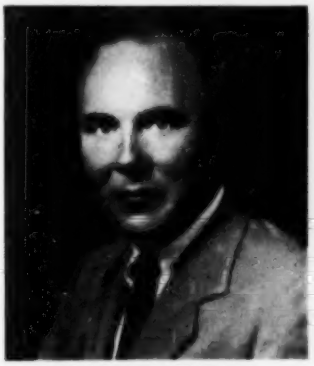
Iowa State Fertilizer Conference, Ames, Ia., December 12-14.

American Association of Economic Entomologists, Denver, Colorado, Dec. 18-21.

Northeastern Weed Control Conference, New Yorker Hotel, New York, January 3-5.

U. S. Potash Names Gidney

Dean R. Gidney has been named sales manager of the U. S. Potash Co., New York, the company has announced. Mr. Gidney has been



DEAN R. GIDNEY

with U. S. Potash since 1937, with five of the intervening years being spent in the U. S. Armed Forces. He was returned to inactive duty as Lt. Commander in the Navy, and took up his former position with U. S. Potash. In 1948 he was made assistant sales manager, which position he held until his recent advancement.

He is a graduate of Dartmouth college, a member of Phi Beta Kappa, and was an outstanding Soccer player, having been named on the All-American team.

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Miss. Fertilizer Conference

The annual Mississippi State Fertilizer meeting will be held at Biloxi, Miss., October 26 & 27, it has been announced by Dr. W. R. Thompson, associate leader in extension agronomy, Mississippi State College. Headquarters for the convention will be the Hotel Buena Vista.

According to the advance plans, registration will begin in the hotel lobby at 3 p. m. on the 26th, with a banquet that evening at 6:30. The formal meeting will continue all day Friday, October 27, ending with a shrimp jamboree Friday night.

Connecticut Station Passes 75th Year

THE oldest agricultural experiment station in the U. S. had its 75th anniversary September 28 and 29, with appropriate ceremonies. The Connecticut station, New Haven, began its two day observance with an open house. Speakers at the formal sessions included Arnold Nicholson, managing editor of *Country Gentleman*; Dr. Detlev W. Bronk, president of Johns Hopkins University and head of the National Academy of Sciences.

The second day featured a symposium on "The Research Institute in Modern Society," with four eminent scientists taking part. They were Dr. E. W. Sinnott, Dean of Yale Graduate School; Dr. S. A. Waksman, chief of the department of microbiology, Rutgers University; Dr. Alexander Wetmore, secretary, the Smithsonian Institution; and Dr. George O. Curme, Jr., vice-president in charge of chemical research, Union Carbide & Carbon Corp., New York.

A banquet Friday night was attended by official delegates and the station staff, who were welcomed by Connecticut's Governor Chester Bowles, president of the Station Board of Control. Toastmaster was John Lyman, member of the Board of Control. Institutions offering greetings to the station at the dinner were:

Agricultural Research Administration, U. S. Department of Agriculture, represented by Dr. P. V. Cardon, administrator; Section of Experiment Stations, Association of Land-Grant Colleges and Universities, represented by Dr. M. H. Campbell, director of the Rhode Island Agricultural Experiment Station; Rothamsted (England) Experimental Station, represented by Dr. Frank Yates, head of the Statistical Department; Wesleyan University, represented by Dr. J. W. Peoples, Professor of Geology; University of Connecticut represented by Dr. A. N. Jorgensen, President; Yale University represented by Dr. Sinnott; Industrial Research Institute, Inc., represented by Dr. N. A. Shepard, Chemical Director, American Cyanamid Company; the American Association for the Advancement of Science, represented by Dr. G. A. Baitsell, Professor of Biology, Yale University, and the National Academy of Sciences, Dr. Bronk.

As a permanent memento of the celebration, a tablet marking the spot of the first agricultural experiment station in America, was unveiled. Presentation was made by Raymond A. Loring, chairman of the Connecticut Development Commission. Mr. Lyman accepted the plaque on behalf of the station.

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New Plant Under Way

Richmond Guano Co., Richmond, Va. has begun construction of a new superphosphate plant featuring a 40-ton Sturtevant den in a Luria steel and asbestos building, 100 x 200 ft. in size. The former plant was destroyed by fire in 1934.

Geigy Company Sales Staff in Recent New York Conference

Branch managers of the Insecticide Division of Geigy Company, Inc. met with members of the board of directors at the annual banquet for the salesmen following the September meeting of the N. A. C. Association at Spring Lake, N. J. From right to left, they are: C. W. Mahnken, Secretary; J. C. Dietsche, Vice President and Treasurer; R. J. Zipse, Sales Manager; Dr. G. R. Ferguson, Technical Director; W. F. Zipse, President; W. R. Peele, Southeast Branch Manager; Charles Remington, Florida State Manager; C. A. Suter, Executive Vice President; E. L. Jarrett, Southwest Branch Manager; E. C. Gerdes, Midwest Branch Manager; John Plowden, Assistant sales Manager; R. H. Griffin, Western Territory Manager; C. L. White, Assistant Southeast Branch Manager; Larry Harman, Northwest Manager; Paul Mills, Rocky Mountain Manager; and R. T. Parker, Head of Legal Department.

To Oregon Fertilizer Post

Oregon Washington Fertilizer Co., Seattle, has announced that Wm. R. Chorlton has become manager of the firm's factory at Portland, Oregon. Mr. Chorlton was formerly associated with the Simplot Fertilizer Co. as a sales representative in the state of Washington. He is a graduate of Washington State College, and worked with the State Department of Agriculture before his connection with Simplot. During World War II, he was a Marine Corps member.

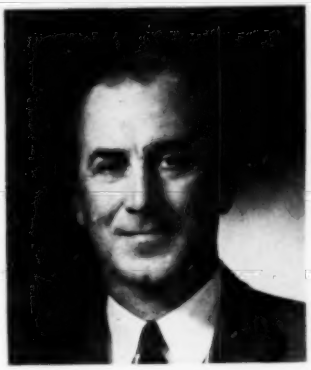
Mac C. Taylor, president of Oregon Washington Co., states that the necessity for a full-time manager for the Portland plant has become urgent with the rapid growth of business in that area. The plant was erected in 1948.

Pennsalt Co. Celebrates 100th Birthday

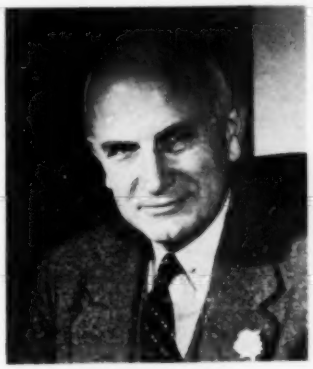
OBSERVANCE of its 100th anniversary was made by Pennsylvania Salt Mfg. Co. in a week-long celebration beginning September 25. Speakers invited to appear at various luncheons, dinners and other gatherings in honor of the occasion, included James H. Duff, Governor of the state; George B. Beitzel, president of Pennsalt, and other officers of the company. A book, "Prologue to Tomorrow" written by Robert Keith Leavitt was prepared for the occasion, to present the history of the firm which began operations in 1850.

The first centennial event was a luncheon on Monday, September 26, at which Gov. Duff spoke after being introduced by Leonard T. Beale, chairman of the Pennsalt board of directors. The luncheon was held at the company's Whitemarsh Laboratories near Philadelphia, seat of the firm's research activities.

On Tuesday evening, a dinner party was held at Whitemarsh for all the company employees from plants in Easton and Cornwell Hts., Pa., and all retired personnel residing in the area.



FRED J. SHANAMAN
Pennsalt Washington State President



GEORGE B. BEITZEL
President of Pennsalt Co., Phila.

The following day, members of the press and other industrial and business friends were invited to a luncheon at Whitemarsh, at which Messrs. Beitzel and Beale spoke. The group toured the laboratories following the luncheon.

Thurday and Friday were occupied by the first meeting ever held of the entire Pennsalt sales force, terminating with a dinner to which employees and their wives were invited.

The Pennsalt Whitemarsh Laboratories near Philadelphia, scene of centennial observance. Building is an old mansion converted into chemical laboratory for all of company's experimental work, including agricultural chemicals.

Mathieson Personnel Shifts

Changes in the operating division of Mathieson Chemical Corporation have been announced recently. The transfer of some personnel and the promotion of others are a result of the corporation's several expansion programs.

R. B. Worthy, vice president, formerly general manager of both the Saltville, Va., and Baltimore, Md., operations, will now devote his entire time to the Saltville operations where he will make his headquarters. His new responsibilities include supervision of the construction and operation of the new $6-million electrolytic chlorine plant at Saltville.

Arthur T. Bennett, vice-president, formerly general manager of SASCO operations, with headquarters in Houston, has been appointed general manager of the Baltimore operations.

Mathieson's southwestern plants, formerly operated as a group, have been formed into separate operating divisions with the following management:

Joseph Mullen, Jr., has been appointed operating manager of the Little Rock (Arkansas) operations which consist of fertilizer and acid plants. H. T. Galt has been appointed assistant operating manager at Little Rock.

James S. Gilliam has been named operating manager, Sulphur Recovery operations, consisting of sulphur recovery plants at McKamie and Magnolia, Arkansas.

R. T. Braun has been made operating manager of Southwestern Acid Plants operations, consisting of sulphuric acid plants at Port Arthur and Beaumont, Texas, and Bossier City, Louisiana.

W. S. Miller has been appointed operating manager of the Houston (Texas) operations, and John R. Beathy, assistant operating manager. The Houston operations consist of fertilizer and acid plants at Pasadena, a sulphur plant at Houston, and an engineering department for servicing all the southwestern plants.

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Weed Program Planned

Although meeting plans were far from complete as the October issue went to press, the program was taking shape for the seventh annual North Central Weed Control Conference to be held in Milwaukee, December 13-15.

Special problems to be discussed at the meeting are state weed control measures, aerial spraying and chemical effects on plant metabolism. Nearly a thousand persons are expected to be in attendance, with weed specialists from all of the midwestern states and from Canada present.

Phytopaths Meet in Dec.

Plans for the December 1-3 meeting of the American Phytopathological Society were under way at press time, with deadline for abstracts being set for October 15, according to Dr. Curtis May, Beltsville, Md., APS secretary. The 1950 fungicide colloquium will be held, as will sessions on methods of teaching plant pathology, stone fruit virus disease, and a conference for extension workers. The annual banquet will be held December 2 at the Peabody Hotel, Memphis, Tenn., meeting headquarters.

In addition to the APS, the Potato Association of America will meet at Memphis, and joint sessions of the two groups are being arranged. The Southern Division of the APS will hold its annual meeting with the parent organization this year.

•

Ithaca Meeting is Planned

November 13-15 are the dates set for the 12th annual insecticide and fungicide conference at Ithaca, N. Y., and program plans are well under way. According to Dr. G. C. Kent, head of the department of Plant Pathology, Cornell, the first day will be devoted to application equipment and the final two days to reports of tests made during 1950 and recommendations for 1951 pest control measures.

The annual dinner will be held on the 15th. The meetings will be held in Bibbins Hall through the courtesy of G.L.F.

•

N. J. Fertilizer Conference

The annual meeting of fertilizer manufacturers and dealers was held at Rutgers University, New Brunswick, N. J., September 28. Presiding over the sessions was Dr. W. H. Martin, dean of the college of agriculture and director of the experiment station. Dr. Stacy B. Randle, Rutgers, was in charge of arrangements.

Speakers on the program included Dr. John R. Taylor, American Plant Food Council, Washington, D. C.; John C. Crissy, GLF Soil Building Service, Ithaca, N. Y.; Rodney A. Briggs, Rutgers; Dr. E. R. Purvis, Rutgers, and Dr. Firman E. Bear, head of the soils department at Rutgers.

Dr. Bear told his hearers that certain weeds may make "highly important contributions in mobilizing minor elements in the soil." This statement was made in connection with his talk on the need for more organic matter in the soil, which he termed as "a matter of great importance."

PRENTISS

(*Continued from Page 61*)

announced the removal of the Prentiss insecticide plant to new and larger quarters. Formerly at Newark, N. J., the insecticide manufacturing division is now located in a building adjacent to the present Prentiss chemical and botanical processing plant at 261 King St., Brooklyn 31, N. Y. The move consolidates all of the Prentiss manufacturing operations at the new address, 253-261 King Street.

Fertilizer Short Course

The Fertilizer Technology Short Course was held at the University of Maryland August 21-25, sponsored by the Fertilizer Committee of the Soil Science Society of American. Representatives of the teaching and research staffs from 25 states and representatives from the industry were in attendance. This course was reported to be the first of its kind ever given.

Papers were presented by technical workers from the industry and State and Federal soil scientists. Detailed discussions were given on the source and supply of fertilizer materials, and on many phases of the technology and processing of fertilizer materials and fertilizers. Time was provided for discussion after each paper for the presentation of additional points.

The course included a study of manufacturing processes in fertilizer plants. A visit was made to the synthetic ammonia and nitrogen fertilizer plants of the Solvay Process Division, Allied Chemical and Dye Corporation, Hopewell, Virginia, on August 22. On August 24, a visit was made to the sulfuric acid, superphosphate and mixed fertilizer plants of the Davison Chemical Corporation at Curtis Bay, near Baltimore, Md.

The papers given in this short course will be published as a monograph of the American Society of Agronomy. Announcement will be made when this monograph is available for distribution.

The subcommittee on arrangements for this short course was composed of Kenneth D. Jacob, Chairman, Randall J. Jones, Albin O. Kuhn and Maurice Lockwood.

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Hoof & Mouth Controlled?

After a battle of four year's duration, veterinarians from the U. S. and Mexico believe they may have won a major victory over hoof-and-mouth disease which broke out in Mexico in 1946. During this period, over 17 millions animals were vaccinated against the disease.

No incidences of the disease have been noted since last December and the vaccination program has halted, temporarily, to enable the scientists to see if the malady recurs after the 120-day immunity wears off. Elaborate precautions are being taken to prevent an outbreak, and to keep it under control should it appear. That the disease would spread rapidly in the U. S. is well known by livestock authorities, and no chances are being taken to allow the sickness to enter the country's borders.

Eastern A. A. E. E. to Meet

The 22nd annual meeting of the Eastern Branch of the American Association of Economic Entomologists will be held at the Warwick Hotel, Philadelphia, Nov. 20 & 21, according to Dr. B. F. Driggers, Rutgers University, Secretary of the group. The program was expected to be announced early in November, Dr. Driggers said, it being incomplete at press time.

Spencer Chemical Appoints Two in Expansion Move

Spencer Chemical Co., Kansas City, Mo., has announced the appointment of additional sales personnel. Robert H. Mullett will represent the company in Alabama and Floyd N. Miller will act as technical services specialist for the new southeastern sales division.

ROBERT H. MULLETT

FLOYD N. MILLER

Mr. Mullett is a native of Mississippi, and a graduate of the state University. He served two years with the U. S. Armed Forces in France during World War II. His home is in Montgomery, Alabama.

Mr. Miller, a native of Louisiana, is a graduate of La. State College. He was formerly associated with the Barrett Co. and with various divisions of Allied Chemical & Dye Corp., and with Farm Fertilizers, Inc., Omaha, Nebraska, with responsibilities in both sales and production. He will make his headquarters in Atlanta, Ga.

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Yakima Conference in Nov.

The second annual Aerial Dusting and Spraying Conference is scheduled to be held at Yakima, Washington on November 2 & 3. Sponsors of the program include the State Aeronautics Commission, the Institute of Agricultural Sciences of the State College of Washington and the Washington State Department of Agriculture. Speakers are expected to be present from the U.S.D.A. Bureau of Entomology and Plant Quarantine, the Civil Aeronautics Adm., members of the departments of plant pathology, entomology and agronomy of the State College of Washington, and the Washington Flying Farmers.

New TVA Experiment

Tennessee Valley Authority has joined in an experimental undertaking with six independent fertilizer manufacturers through which TVA-manufactured fertilizers will be distributed to farmers to determine distribution costs and practices. The additional information is to supplement data presently being obtained through farmer cooperatives.

The six companies involved include: Summers Fertilizer Co., Baltimore, Md.; Sylacauga Fertilizer Company, Inc., Sylacauga, Alabama; Epting Distributing Company, Leesville, South Carolina; Knoxville Fertilizer Company, Knoxville, Tennessee; Capital Fertilizer Company, Montgomery, Alabama; and Pocahontas Fertilizer Company, Pocahontas, Iowa.

Contracts with these companies are generally similar to those now in effect between TVA and cooperatives. The distributors agree to keep a supply of the fertilizers for sale unmixed with other materials and to use the remaining fertilizers only in high-analysis mixtures. TVA will be supplied with records of the costs of handling and distributing both TVA materials and comparable products obtained from private sources.

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Canadian Weed Conference

Program plans for the Fourth Western Canadian Weed Control Conference are practically completed, according to H. E. Wood, chairman of the Weeds Commission, Manitoba Dept. of Agriculture, Winnipeg. The meeting, to be held at Regina, Saskatchewan, November 21 and 22, will be built around the theme, "Effect of Chemicals on Crops," and "Chemical Weed Control." The annual banquet will be held on Tuesday evening, Nov. 21.

Speakers covering the effect of 2,4-D on cereals will include Dr. P. J. Olson, J. G. Davidson, J. R. Foster and Dr. W. O. Chubb. H. W. Leggett will discuss the effect of 2,4-D on legumes. The afternoon session, on chemical weed control, will be under the chairmanship of N. F. Putnam, with speakers listed as J. P. Ficht, B. J. Gorby, J. J. Sexsmith, L. Playfair, A. C. Carder, E. T. Anderson and W. J. Breakey.

Wednesday's session will have as chairman, Prof. E. A. Hardy, with speakers including M. Wood, D. D. Fraser and Drs. W. J. Corns, T. K. Pavlychenko, R. T. Coupland, H. A. Friesen and A. Wenhardt. Chairman for the afternoon session will be J. R. Foster, with speakers reporting weed work in four provinces of western Canada.

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To Chem. Procurement Co.

Stuart J. Canter, formerly of Polytechnic Institute of Brooklyn is now associated with Chemicals Procurement Company, New York. The company acts as sales agents for specialty and intermediate chemicals. It also serves in the capacity of chemical broker.

TECHNICAL BRIEFS

(*Continued from Page 59*)

per cent and dimethyl-naphthalene at 9 per cent gave good selectivity. Aromatics such as triethyl-benzene, methyl-naphthalene, and others gave no selective action. Application in the pure form at low rates was unsuccessful for obtaining selectivity with the highly toxic hydrocarbons and oils.

An attempt was made to account for the differential response of plant species to herbicidal oils. Both nontoxic and toxic oils were stained, and the distribution of the dye was observed in plants treated with the stained oils. Nontoxic oil was found to penetrate plant tissue, but not to penerate living cells. Only oils that produced injury were found inside parenchyma cells.

Thus, toxicity appears to be associated with cell penetration. These studies further suggest that resistance to injury does not depend on differential foliage penetration.

Tests of several plant species suggested that resistance to injury by petroleum hydrocarbons may be associated with the presence of essential oils or oil ducts. Theories advanced by other workers for differential susceptibility were reviewed, and some additional theories were suggested—"Herbicidal Properties of Petroleum Hydrocarbons," by John R. Havis, Cornell University, Ithaca, N. Y. Memoir 298, August, 1950. (Summary)

INSECT SITUATION

(*Continued from Page 53*)

aid in channelling supplies of insecticides to those cotton-growing areas where they were most urgently needed. Reports from some areas indicated that cotton farmers were obtaining adequate insecticide supplies, although they often were not able to get the particular material they would prefer to use. However, the seriousness of the situation was indicated by the cotton insect survey report prepared by the Bureau of Entomology and Plant Quarantine on September 1, which pointed out that the insecticides needed for control of the cotton leafworm, boll weevil, and bollworm continued in short supply at that time in northern and western Texas and in Oklahoma, and some shortages of materials for boll weevil control still occurred in parts of Arkansas, northern Alabama, and in the Piedmont section of the Carolinas.

SUPPLY OUTLOOK

(*Continued from Page 41*)

51 marketing season which is considered a dangerously low figure as things stand in view of the possibility of an emergency.

The program for the 1951 season will undoubtedly mean an increase in acreage. In order to be assured of a sufficient amount of insecticides, further provisions will have to be made for the necessary raw materials to produce at least an amount of insurance insecticides which will have to be made available. In all probability, there will be curtailment of some of the chlorinated materials, particularly those requiring benzene, but ample provisions will have to be made by the industry to produce a sufficient amount of both organic and inorganic materials to take care of these poten-

tial requirements. Certainly, the arsenicals, nicotine and similar materials that were used before the advent of the newer organics will find a place in the control programs for the coming season.

The insecticide industry can well take a page from the experience and educational program which the fertilizer industry is carrying on at the present time, urging that stocking up of insurance quantities should be undertaken as promptly as possible. It is even more important this year that the industry supplies should move steadily from the plants to dealers and consumers since adequate working stocks will be well worth the necessary investment of money and space.

In general, no greater economic controls are foreseen within the next 2 to 3 months unless there is further tension in the international situation. Insecticide manufacturers should take in materials as they become available from the manufacturers of the basic materials. Materials should be formulated as promptly as possible and moved out to mixers, dealers and consumers.

DISEASE CONTROL

(*Continued from Page 53*)

3.4 and one ounce at one week or one day storage. At 1¼ ounce there was a slight drop in vigor, but the plants were still more vigorous than the check.

When making small scale treatments with "Panogen," by taking care and giving much agitation quickly, the red dye can be distributed fairly evenly all over the seed. However, the unevenness, as judged by the red dye on the kernels, of the treatment attained by use of a special "Panogen" treating machine was striking. From a sample of this treatment kernels of three classifications were selected for germination tests, with the following results, using the same method as described for wheat:

Random sample 92.7% germination
Kernels with least red dye 98.0% germination
Kernels with most red dye 23.2% germination

It appeared obvious that the mixing was inadequate for satisfactory results. Excess treatment of some of the kernels stopped germination or reduced vigor, while other seeds probably did not receive sufficient treatment to give adequate disease control.

To compare the relative safety of three mercurial compounds proven to be effective seed disinfectants, their effect on the germination of wheat seed was tested (Table 3). A normal dosage of ½ ounce per bushel of "N.I. Ceresan" caused damage when the treated seed was stored three months in a closed bottle before planting; higher dosages increased the damage. "Ceresan M" caused somewhat less damage, while "Panogen" appeared to be even better than "Ceresan M" in these tests in which the mixtures were thorough. This corresponds with results of the test above.

ORGANIC CULT

(Continued from Page 31)

man reports, "our data indicates clearly that it is possible to affect insect abundance by varying certain of the mineral elements in the soil." . . .

"Frankly, our work is still pretty much exploratory . . . We are finding that so many factors enter into any particular experiment that we have to go cautiously and avoid too premature conclusions on our findings from year to year. However, we are rather definitely convinced in our own minds that the tendency for insect pests to become worse as agriculture ages in any community has a direct connection with the tendency through overcropping and erosion for soil fertility to go down as agriculture ages in a community. In the past this tendency of insects to build up we have attributed simply to the unbalancing of nature through progressive agriculture, but we are beginning to think that the unbalancing of nature which has the effect of making insects get worse is the continual lowering of the level of soil fertility. If we are right, then some day we should be wise enough to know how at least partially to re-balance nature through the judicious use of fertilizers.

"In our investigations to date we are not prepared to say that organic fertilizers are the determining factor rather than the regular commercial fertilizers for to date we have been working primarily with manipulation of the soil minerals and generally much of that is tied into the regular commercial fertilizers on the market. I think Dr. Albrecht's studies with the influence of the soil minerals through the crops into livestock and man are likewise based on soil minerals and not organic fertilizers exclusively."

Dr. Haseman's views are apparently shared also by a U.S.D.A. official who comments unofficially as follows: "Plant vigor—and, of course, there are many things which affect and influence vigor—has some relation, in certain cases rather easily observed, to the susceptibility of the plant to attack by insects. Just what the relation is between soil nutrients and such vigor has not been firmly established. To try to draw conclusions that this difference in susceptibility to attack by insects is due to added organic or chemical material, and that additions made to the soil were solely responsible, could not be firmly established without intensive, long time, carefully planned experiments. Even then, there might be a question as it has been definitely established that difference in the vigor of certain kinds of forest trees growing in close proximity to each other on undisturbed land in remote forested areas has a direct relation to tree susceptibility to attack by certain destructive bark beetles."

Organics Only?—Bunkum!

WHILE they do not refer in articles which have come to our attention to the subject of possible immunity from insect or dis-

ease attacks of plants fertilized solely with organic materials, several other prominent scientists connected with various state experimental stations have made some rather strong observations on the general thesis of "organiculture."

In an article in the Autumn, 1946, number of *The Land*, Prof. Emil Truog, Chairman, Department of Soils, University of Wisconsin, Madison, Wis. made the following comments on the "organics only" thesis: "Soil organic matter is of tremendous importance: it facilitates the intake of water and thus reduces runoff and erosion. It also favors workability or ease of cultivation, aeration and drainage. Fresh organic matter contains all of the elements needed for plant growth, which, as decomposition proceeds, are released in forms suitable for new plant growth. . . . However, to say (as the 'organic school' does) that chemical fertilizers, such as super-phosphate and muriate of potash should not be used to make up inevitable deficiencies of nutritive elements that cannot be supplied through the use of organic matter is just pure bunkum."

More recently, April 1, 1950, this same authority was quoted in part as follows:

"Fertility elements in commercial fertilizers are fully as available to crops as those in organic materials, and in some cases even more so. . . . There is absolutely no difference in the nature of the nitric and sulfuric acids formed in the soil from organic matter through the action of bacteria, as the nature of these same acids as used in a fertilizer factory . . . The form in which plants take up their nutrients is the same whether they are originally supplied as organic material, such as compost, or commercial fertilizer.

"It is true that the use of composts adds to the supply of organic matter in soils, and in this way promotes a better physical condition of soils . . . this use may be important, especially with the city gardener . . . the farmer in general, however, cannot cover his large acreages with compost. Sufficient amounts of leaves and other organic materials just do not exist on his farm for this."

Dr. Firman E. Bear, Chairman, Soils Department, N. J. Agricultural Experiment Station, New Brunswick, N. J., refers to the organic group as an "international cult . . . cluttering up our soils' literature with a mixture of facts and fancies that are so cleverly interwoven that it is very difficult to know where one leaves off and the other begins. . . . Such teachings link the farmer inseparably with the manure pile and peasantry. They set aside some of the most important findings of a century of agricultural science."

Further attempts are being made to seek out informed opinion on this controversial topic, and the editors of AGRICULTURAL CHEMICALS will welcome opinions from readers for publication in later issues.

ACS FERTILIZER

(*Continued from Page 43*)

port, read in his absence by Dr. K. G. Clark.

Data were presented on a study of delivered costs of solution and solid forms of nitrogen at typical fertilizer producing points throughout the country over a period of years. This revealed that liquid forms of nitrogen have been cheapest at most points in the U. S. since 1926, but not at all points in every year. In 1944 the difference in delivered cost between liquid and solid forms of nitrogen began to increase, reaching a maximum in the spring of 1950, the figures show.

"During the 1949 season," Dr. Mehring stated, "liquid nitrogen was 7 cents a pound cheaper than in ammonium sulfate delivered at some points in the southwest and 4½ cents or more per pound at all points in the U. S., except in the far west. Nitrogen was 3 cents per pound cheaper in liquid form at the point of minimum difference, Los Angeles, Cal.

"The low cost of liquid ammonia induces farmers to make the necessary investments so they can handle it on the farm. Use has grown rapidly in recent years, to 69,000 tons in the year ending June 30, 1949. This usage will undoubtedly continue to grow as ammonia remains substantially cheaper than sodium nitrate, ammonium sulfate and similar materials."

Corn cobs offer promise as a new source of material suitable for conversion into fertilizer, Dr. G. L. Bridger of Iowa State College, revealed in a paper which detailed the procedure, developed at the Iowa station. This process, using hydrolysis and ammoniation of the cellulosic components of the cob, can also be applied to other farm wastes and to some woods, he said, although yields from the cellulose in trees is lower than from the cobs.

Three different types of inexpensive nitrogenous fertilizers were obtained from the cobs, he said, and one of the trio, in particular, showed growth response in plants comparable to that obtained from ammonium sulfate. The new products are suitable for direct application or for mixing, he stated. Suggestive of the possibilities of this development, Dr. Bridger pointed out that there are 20 million tons of corn cobs available in the U. S. annually, with four million in Iowa alone.

At Wednesday morning's final session of the Fertilizer Chemistry division, E. C. Houston of the Tennessee Valley Authority, Wilson Dam, Ala., described a process investigated at Muscle Shoals which foreshadows high analysis fertilizers at lower costs.

The process, he explained, consists of three principal operations: (1) rock phosphate is decomposed with nitric and phosphoric acids; (2) ammonia is added to this rock-acid mixture; and (3) the material, in the form of a thick mud, is dried and mixed with muriate of potash.

Pilot plant production was at a rate of 4 tons per day and about 300 tons were made for test purposes. Rock phosphate of several commercial grades was used successfully and grades of fertilizer produced included 17-22-0, 14-14-14, 11-22-11 and 12-33-0. The materials produced compare

favorably with fertilizers in general use, with respect to storage properties, ease of application and crop response, Dr. Houston said. The principal plant food components in the product have been in use for years, either as separate materials or as ingredients of dry-mix fertilizers.

A similar process was used in Germany in 1930, Dr. Houston stated, but had not attracted attention here because there was little nitric acid available prior to World War II; also because the fertilizer industry was designed to utilize other raw materials, then plentiful here. Farmers and experiment stations were also unfamiliar with high analysis fertilizers.

Cost of nitric acid and ammonia has now decreased, while cost of many more common fertilizer raw materials has increased, so that conditions are now favorable, Dr. Houston said, for use of the process in this country. Substantial savings should result, he declared, due to lower manufacturing costs, also to lower costs for bagging, shipment and distribution on the farm.

In a paper on "Acidulation Characteristics of Certain Western Phosphate Rocks," Dr. E. H. Brunsting of Iowa State College, reported on work, done in cooperation with Dr. G. L. Bridger, to determine if rocks of western origin could be utilized in place of Florida rocks, thereby reducing transportation costs. Three types of rocks obtained in Idaho were utilized.

The Idaho rocks compared favorably in every way with Florida rocks, Dr. Brunsting declared. However, because of rapid solidification, storage time for the western rocks would be limited.

In another technical paper Dr. R. W. Moulton of the University of Washington described production of phosphate fertilizer by the fusion of phosphate rock and olivine. In a pilot plant, power consumption, electrode consumption and other production costs were evaluated and operating difficulties with refractories, the graphite, temperature control and other factors ascertained. The fertilizer could be produced within a favorable operating range, Dr. Moulton said, although there are definite boundaries to commercial operation.

Final paper on the program was a report on the fertilizer industry in the United Kingdom, the Netherlands and Norway, from observations made by Dr. K. G. Clark and John O. Hardesty of the Bureau of Plant Industry. Dr. Clark, who read the jointly prepared paper, told how equipment, process and products were studied in two plants in Norway, two in the Netherlands and twenty in the United Kingdom.

Of particular interest was his revelation that output of United Kingdom plants run from 3 to 18 tons per hour, also that only a few grades are made and that about 75 percent of production is in the granular form. A 100 percent production of granular grades is, however, anticipated within two years, Dr. Clark said.

The group re-elected its chairman and secretary at the meeting.

Dr. Vincent Sauchelli remains as chairman of the Division of Fertilizer Chemistry and Dr. S. F. Thornton, F. S. Royster Guano Co., Norfolk, Va., will continue as secretary in 1951. Members of the excutive committee are: Stacy B. Randle, C. A. Butt, J. D. Romaine and H. B. Seims. Councilors are James A. Naftel and W. H. MacIntire, with alternates H. P. Cooper and K. G. Clark.

Next year's ACS annual meeting will be held in September, 1951, in New York City.

NAC MEETING

(*Continued from Page 28*)

distributed to acquaint medical men with such cases. Antidotes for accidental poisoning occupy a key position in the matter, he said, and more information is needed on specifics.

The final event of the meeting was the panel discussing problems arising from the presence of insecticidal residues in soil. Dr. Rohwer introduced the subject, pointing out that the problem is not a new one. He quoted at length from reports written in 1874 regarding the presence of paris green in the soil, commenting that with proper use of the insecticide there should be no present nor future danger to the soil.

Dr. Victor R. Boswell, U.S.D.A., in discussing crop production, indicated that there are no serious soil accumulations of pesticides. The herbicide 2,4-D breaks down in moist soils in from 1 to 3 months, he said, but there remains a potential problem with DDT and BHC, both of which are more stable and are used more extensively than herbicides or fungicides. He reported that quantities of DDT used for three or four seasons tended to reduce the growth of some sensitive cover crops, and that after five years, some DDT still remained in the soil. Traces of BHC still remained after four years.

Appearing as the final speaker on the panel, Dr. Charles L. Smith, Ethyl Corp., New York, stated that the outlook for coordinated effort is better now than ever before. He said that the chief concern is that of safety to operators who handle the toxicants, then to animals and host plants to which the insecticidal materials may be applied. The soil problem has been on the increase of late years, partly due to the increased use of organic insecticides which may present more serious problems.

Although it is impossible to know all of the answers on the subject, it is imperative to find out more about a remedy, he said. At present, we do not know how serious the problem is, but "we must begin to find out," he concluded.

The annual banquet was held on Thursday evening.

Clifton A. Woodrum, APFC President, Dies

CLIFTON A. Woodrum, 63, president of the American Plant Food Council since its founding in 1945, died unexpectedly October 5 in Washington, D. C., headquarters of the Council.

His passing came as a profound shock to the industry and particularly to members of the Association of Fertilizer Control Officials who were meeting that day at the Shoreham Hotel in Washington. Mr. Woodrum was scheduled to appear on the morning program, and many of his business friends had chatted with him at a banquet only the evening before. The death forced cancellation of the Plant Food Council's dinner scheduled to be held October 5 in honor of the control officials.

CLIFTON A. WOODRUM

Judge Woodrum had had a long and impressive 23-year record as a Congressman from Virginia before retiring to become head of the Council. He had become ranking member and Acting Chairman of the House Appropriations Committee, a key position during the prewar period of Congressional spending for national defense and during the years of World War II. Although he piloted huge appropriation measures through the House, he continuously voiced a demand for economy.

Throughout his long political career, Mr. Woodrum was known to his colleagues as a leader of the moderate and conservative element on the Democratic side of the House—a position which frequently put him at odds with the administration leadership.

Once described as "a moderate who would like to go along with the New Deal but has the courage to oppose it when he can't honestly agree," Mr. Woodrum occasionally differed sharply with the Roosevelt administration. Even after his retirement, he seldom missed an opportunity to take a slap at White House policy when he thought it in error.

Representative Woodrum was born in Roanoke, Va. His formal education was brief. At the age of 13 family financial troubles forced him to leave school and get a job, first as an errand boy and later as a soda-jerker.

While working at the drugstore, he took time off to study pharmacy, becoming a licensed pharmacist. Then he studied law, eventually graduating from Washington and Lee University.

Admitted to practice in Roanoke in 1908, he made a reputation as a criminal lawyer that led to his appointment as Roanoke's commonwealth attorney in 1917. Two years later he was named to the bench of the Hustings Court for the city where he presided until 1922 when he resigned to enter the race for Congress. He won and was re-elected to 10 succeeding Congresses.

The veteran politician was a tall pleasant looking man, with a sonorous voice and a rather solemn manner which did nothing to interfere with a friendly personality. As a congressman, it was his habit to keep an electric grill and a coffee pot in his office, to give him an early-morning start on his colleagues and his office staff.

He also enjoyed the reputation of being an able legislator, careful in his study of prospective laws, shrewd in committee and impressive on the floor. He was accepted early as a member in good standing of the intimate circle of the most influential Representatives, led at the time by Nicholas Longworth and John N. Garner. From them he learned much of his political know-how.

When he first entered Congress, he was appointed to the Civil Service and Public Buildings and Grounds Committes, comparatively minor assignments. In December, 1929, he won his transfer to the major assignment of the Appropriations Committee.

Surviving are his widow, the former Miss Lena Hancock, and two children, Clifton, Jr. and Martha Anne. Burial took place at Roanoke on October 9.

Chase Bag Builds in Ohio

Chase Bag Company has announced the award of a contract for design and construction of a new pulp storage warehouse at Chargrin Falls, Ohio, to The H. K. Ferguson Company, Industrial Engineers and Builders.

The warehouse will be 86 feet by 218 feet, and a 25-ft. clearance will be provided from the floor to the under side of the structural steel frame.

FERTILIZER PROGRESS

(*Continued from Page 47*)

Conclusions

1. We are running a deficit in the plant food bank account. The rate of withdrawal of all plant food elements exceeds the rate of replacement.

2. Just as hybrid corn has increased the crop yield and correspondingly increased the plant food demand, the development of high yielding strains of other crops will follow the same pattern.

3. As living standards continue to increase, the consumption of food will probably continue to grow faster than the population increase. Food consumption has increased 25% since 1930—15% from population increase, 10% from greater per capita consumption.

4. These trends will probably accentuate the deficiencies of the minor elements.

5. With the possible exception of sulfur, all the major elements are in ample supply. Present reserves of sulfur are good for 15 years—after that we must again turn to pyrites, and possibly to petroleum and natural gas. Reserves of phosphate rock are ample for thousands of years, nitrogen comes from the air, and potash seems adequate for the foreseeable future.

6. In the final analysis, the real problem for the coming 50 years is to maintain adequate plant food balances in the soil. Once depleted, the process of restoration is difficult. Given the proper economic and political environment, the fertilizer industry is ready to undertake the job.★★

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Davison Advertising Brochure

NITROGEN

(*Continued from Page 24*)

nitrate of soda.

During the same period, the "Beast" reared its head and brought to a focus our complete dependence on foreign nitrogen supplies. This warning was heeded and immediately led to the construction of the first synthetic ammonia plant in the United States, in 1921. Along with

this development, progress was made in the manufacture of synthetic nitrate of soda, which finally entered the fertilizer market in 1929 at a price competitive with natural nitrate.

It was not long after the appearance of Chilean nitrate in the United States that this source of nitrogen was supplemented by the appearance of ammonium sulfate. By-product ammonium sulfate was first produced in this country in about 1893. About 1 percent of the fertilizer nitrogen came from this source in 1900, and production of by-product sulfate mounted to over 757,000 tons in 1949. Ammonium sulfate met with such favor as a nitrogen fertilizer that limited quantities of our synthetic nitrogen production were converted to ammonium sulafte in 1923. The demand has been so great that more and more synthetic ammonia has been used for this purpose. 1949 saw a production of well over 539,000 tons of synthetic ammonium sulfate.

Cynamide made its appearance on the fertilizer market during the development of the ammonium sulfate market. The first cyanamide plant, and the only operating plant in North America, was constructed in 1909 in Canada. During the World War I period, the cyanamide industry developed rapidly throughout the world, since it supplied a relatively cheap, synthetic fixed nitrogen product which could be converted to ammonia and nitric acid for military uses. The fertilizer-grade cyanamide contains approximately 21 percent nitrogen. Its use, however, is based not only on its nitrogen content; but also, on its characteristic of conditioning fertilizer mixtures. Consumption figures show that in recent years the sales of cyanamide have amounted to between ninety and one hundred thousand tons annually. This is less than 5 percent of the total nitrogen consumption of the United States.

The year 1925 saw the advent of the first high-analysis nitrogen material. Seventy-three tons of urea, a material containing 46 percent nitrogen, was imported for agricultural use. This field was untested until 1935 when the domestic production of crystalline urea began. Agricultural use of urea, as such, was handicapped by the affinity of high nitrogen materials for moisture. This trouble was minimized in 1938 by the production of a conditioned urea called "Uramon." The nitrogen concentration of this new product is 42 percent, as compared with 46 percent for the pure urea. Urea consumption figures are somewhat scarce, but it appears that the current consumption of fertilizer urea is below the 34,000 tons used in 1940.

Nitrogen, once more in the form of the "Beast," played his part in World War II which held the world in its grasp from 1939 to 1945. This catastrophe threw the world into its darkest period of depression, but again from the "Beast" there arose a most hale and hearty "Prince." War requirements called for a vast expansion of our fixed nitrogen capacity and ten new synthetic

nitrogen plants were constructed. During the later phases of the war and immediately afterwards, the facilities of a number of these plants were used for the production of fertilizer grade ammonium nitrate.

This material took its place in the domestic fertilizer picture in 1942 as a fully developed primary source of plant food. While not as concentrated as urea, it is a high-analysis nitrogen material and, in general, is delivered to the consumer at a lower unit price than any other solid nitrogen fertilizer. Proper conditioning has given the farmer a 33.5 percent nitrogen material which is used satisfactorily by the farmer for direct application and by the manufacturer for making mixed fertilizers. Previous to 1942, ammonium nitrate fertilizer was available in mixtures such as ammonium nitrate—limestone or—ammonium sulfate. Since then ammonium nitrate fertilizer has moved to the fore, and by far the major portion is used for direct application and in the preparation of ammoniating solutions. This latter category will be covered later, but the consumption for direct application has increased from 182,989 tons in 1943-44 to 340,972 tons in 1948-49.

During the development of the standard primary nitrogen fertilizer materials, a number of attempts have been made to develop other cheap sources of nitrogen. This has been done by placing on the market products containing nitrogen as the only plant food, or nitrogen in combination with one or two of the other major plant foods. Among such materials have been calcium nitrate, Leunasaltpeter, Calurea, A-N-L, Leunaphos, ammonium-potassium-nitrate, Cal-Nitro, Ammonitre, and several grades of Nitrophoska. Some of these materials have stood the test of time, while others have faded out of the picture. Poor condition has almost invariably been the downfall of such nitrogen products.

We have covered only the solid nitrogen materials, but we must not forget for a minute that there are large quantities of ammonia, both anhydrous and aqua, and ammoniating solutions being used in the fertilizer industry. Ammonia, of course, is the basis of most of the solid sources of nitrogen. It has also been used rather extensively in recent years for direct application to the soil either directly or through irrigation water. Figures have been rather fragmentary on the amount of ammonia used for direct application, but it is reported that 65,596 tons of anhydrous ammonia and 5,799 tons of aqua ammonia were used in 1948-49 for this purpose. In addition to this use, certain quantities of both these commodities are used in the ammoniation of fertilizers.

Special solutions were designed and produced in 1935 for ammoniation. The ammoniating solutions on the market at the present time are essentially solutions of ammonium nitrate or urea in ammonia water. They will contain 37 to 49 percent nitrogen, depending on the type of solution. In less than two decades, the amount of solutions produced in this country has grown to about 800,000 tons. This phenomenal growth is due to the conditioning ability of these solutions and the fact that they are an inexpensive source of nitrogen for mixed goods.

Considerable space has been given to a discussion of the individual sources of fertilizer nitrogen. It is also interesting to look at the overall picture of the fertilizer nitrogen industry. Considerable criticism in the past has been directed toward the fertilizer industry and, in some cases, this has led to federal investigations. Most of the complaints have been that the farmer has not been getting full value for the money he has invested in fertilizers. Even a cursory examination of the industry shows the fallacy of such thinking.

It has always been acknowledged, that increasing the plant-food content of fertilizer materials leads to a direct savings through lower handling and shipping costs. Let us examine the path the Nitrogen Industry has traveled toward this goal. In 1900 the average concentration of the nitrogen materials used in the fertilizer industry was 12.3 percent. This has climbed steadily to 29.1 percent in 1949 along the following path—1909, 13.9 percent; 1919, 15.9 percent; 1929, 18.7 percent; 1941, 25.9 percent: and 1944, 26.3 percent. Similar progress has been made in the production and processing of other primary fertilizer materials and mixed fertilizers.

Actual savings in dollars and cents to the purchaser can be shown by the reduced prices of some of the nitrogen materials. In 1920 the natural organics, which were supplying about one-third of the fertilizer nitrogen, were selling at a price of $8.71 per unit. Competition from chemical nitrogen materials brought this price down to $3.55 per unit in 1940, and at this time natural organics were supplying only about a tenth of the nitrogen. Over this same period, nitrate of soda was reduced from $4.44 per unit to $1.68 and sulfate of ammonia from $4.08 to $1.37. Today in spite of increasing costs, the line is being held surprisingly well with sulfate of ammonia selling at $1.56 per unit and ammonium nitrate at $1.73 per unit. Nitrate of soda has not fared as well, and its unit price is $2.81. Because of this it is feeling the competition from other nitrogen materials.

The story of the fertilizer industry closely parallels that of nitrogen, and the economics of this industry has been stated very clearly by the Bureau of Agricultural Economics of the U. S. Department of Agriculture. They state that compared with what it bought in 1939, the farmer's dollar on May 15, 1950, would buy 40¢ worth of seed, 48¢ worth of food, 42¢ worth of clothes, 46¢ worth of feed, 57¢ worth of machinery, 70¢ worth of fertilizer.

Our short survey clearly shows that the "Prince," born of the "Beast," is still growing and is maturing with increased potentialities. At the same time, we can have the gratifying re-assurance that this handsome "Prince" is being nurtured by responsible operators who stand ready to change him to his original status if necessity requires it.

Industry Patents

2,516,477. LECITHIN STABILIZER for DDT Petroleum Solutions. Patent issued July 25, to Charles W. Moberly, Bartlesville, Okla., assignor to Phillips Petroleum Co. A solution of DDT in a petroleum solvent containing from 0.5 to 2.0 weight per cent of lecithin wherein the amount of dissolved DDT is sufficient that, on cooling, the solution will become supersaturated with DDT before reaching the temperature at which the solvent begins to crystallize.

2,517,555. AEROSOL DISPENSING NOZZLE. Patent issued August 8, 1950, to Robert A. Fulton and John H. Fales, Silver Spring, Md., dedicated to the free use of the people of the U. S. An aerosol dispensing nozzle comprising a tubular member having a discharge end and another end adapted to be attached to the outlet of a container, said member having a chamber section, axially disposed walls at the end of the chamber section, said walls having apertures therethrough, the diameter of the aperture in the wall at the discharge end being in the range of 0.016 to 0.024 inch and the diameter of the other aperture being in the range of 0.0135 to 0.020 inch, the area of said aperture through the wall at the discharge end being to the area of the other aperture in the approximate ratio of 3 to 2.

2,518,286. PROCESS OF AND APPARATUS FOR THE MANUFACTURE OF FERTILIZERS. Patent issued August 8, to Antime Constant, Paris, France, assignor to Societe Anonyme des Manufactures des Glaces et Produits Chimiques de Saint-Gobain, Chauny & Cirey, Paris, France. Apparatus for the manufacture of a fertilizer including an enclosure comprising a trough, a perforated transverse partition therein, means to admit a liquid to the trough at one side of the partition, means to withdraw contents from the trough at the other side of the partition, means comprising a helical conveyor to move the contents along the trough, means to deliver finely divided material to the trough comprising a scraper conveyor having a floor cut away to provide an opening of progressively differing size that permits the fall of material in accordance with particular requirements of density, means to enclose the falling material, means to humidify the enclosed space, and means to draw gases gently from the enclosed space and to clean them.

In a chemical process that includes the step of immersing a solid reactant in a bath of a liquid reactant and that includes the evolution of a gas having ingredients of value in the reaction product, the step of passing said evolved gas through a rain of the powdered solid whereby to return some of said gas to the reaction mass.

2,519,088. AQUEOUS DDT PASTE. Patent issued August 15, to I. F. Walker, Houckessin, Del., assignor to E. I. du Pont de Nemours & Co., Wilmington, Del. An aqueous water-dispersible paste comprising a blend of ingredients comprising water, finely-divided DDT of at least technical grade in purity in amount of at least 50% of said paste, a surface-active agent in amount of from 0.1% to 10% by weight of the DDT, and polyvinyl alcohol in amount of from 0.25% to 10% by weight of the water and in amount sufficient to give to the aqueous phase, exclusive of said surface-active agent, a viscosity of at least 10 centipoises at 25° C., said polyvinyl alcohol having a viscosity of at least 10 centipoises in 10% aqueous solution at 25° C.

2,519,243. FERTILIZER SPREADER. Patent issued August 15, 1950, to M. J. Gjertson, Worthington, Minn., assignor of one-half to Milford Davis, Reading, Minn. A fertilizer material spreader designed for attachment to a tractor having a power take-off, comprising a drive mechanism for connection with said power take-off including a vertical rotatably supported shaft, a relatively large plate supported horizontally with said vertical shaft passing centrally therethrough, a material hopper supported above and in spaced relation with the plate, said hopper having a downwardly directed outlet concentric with the vertical shaft, said vertical shaft being extended into said hopper outlet, a plurality of fan blades secured to the vertical shaft to be rotated thereby over and in close proximity to the top surface of the plate, agitator blades carried by the upper end of the vertical shaft and disposed in the hopper outlet, and means for controlling the flow of material through the hopper outlet onto said plate comprising a pair of apertured plates disposed one upon the other and each having an outlet opening, the said pair of apertured plates being positioned to close said hopper outlet, the said apertured plates being both rotatable around the vertical shaft between the hopper outlet and said fan blade, and means for turning the plates together or relative to one another through an arc of at least 180° whereby to discharge the material onto the top of the first mentioned plate upon either of two sides of the vertical shaft.

Trade Mark Applications

WESTVACO, in script letters, for insecticides and fumigants including BHC, DDT, Methyl Bromide, Ethylene Dibromide soil fumigant mixtures and grain fumigant mixtures containing ethylene dichloride, ethylene dibromide, carbon bisulfide and carbon tetrachloride. Filed Oct. 17, 1947 by Westvaco Chlorine Products Corp., New York. Claims use since December, 1926.

DESIGN, in black box with white letters "M P D" thereon, for pest control preparations, namely, insecticides, fungicides and rodenticides. Filed Oct. 28, 1947, by General Chemical Co., (Now Allied Chemical & Dye Corp., New York.) Claims use since July 17, 1947.

MERTHION 642, in black capital letters, for insecticides and agricultural fungicides. Filed Feb. 17, 1949, by Central Chemical Corp., Hagerstown, Md. Claims use since Dec. 20, 1948.

HGI, in large black capital letters, for gamma isomers of benzene hexachloride. Filed Aug. 15, 1949, by Hooker Electrochemical Co., Niagara Falls, N. Y. Claims use since Aug. 18, 1947.

EXCELSIOR, in white capital letters on black background, for sulfur. Filed Oct. 20, 1949, by Stauffer Chemical Co., San Francisco, Calif. Claims use since Aug. 5, 1924.

BIG STINKY, in capital letters arranged in semi-circle, for insect baits and insecticides. Filed Oct. 26, 1949, by William E. Brown, Pewaukee, Wis. Claims use since Sept. 18, 1949.

WEEDEX, in capital letters, with the first and last letters extending below the others, for chemical preparation for exterminating weeds. Filed Nov. 15, 1949, by Robert England, trading as James Good Co., Philadelphia. Claims use since Mar. 21, 1925.

COROMATE, in capital letters, for fungicide for control of plant diseases. Filed Nov. 26, 1949, by Pittsburgh Plate Glass Co., Pittsburgh. Claims use since Apr. 25, 1949.

COROTHION, in capital letters, for insecticide. Filed Nov. 26, 1949, by Pittsburgh Plate Glass Co., Pittsburgh, Pa., Claims use since May 4, 1949.

DILAN, in thin capital letters, for insecticides. Filed Nov. 30, 1949, by Commercial Solvents Corp., New York. Claims use since Oct. 10, 1949.

IMINOL-D, in stencil capital letters, for herbicidal compositions and stabilizers therefor which prevent or retard formation of precipitates or insoluble matters in herbicidal compositions during storage or use thereof. Filed March 21, 1949, by Pittsburgh Coke & Chemical Co., Pittsburgh, Pa. Claims use since Dec. 17, 1948.

CARBACRYL, in capital letters, with the first and last letters in larger size than the others, for insecticides, rodenticides, fumigants, acaricides, herbicides and arthropodicides. Filed Apr. 13, 1949, by American Cyanamid Co., New York. Claims use since Apr. 14, 1949.

TEPCO, in italic capital letters, with first letter larger than others, for benzene hexachloride, benzaldehyde, benzol and benzoate of soda. Filed Nov. 25, 1949 by Tennessee Products & Chemical Corp., Nashville, Tenn. Claims use since July 10, 1947.

NEMAFUME, in capital letters, for soil fumigant. Filed Feb. 14, 1949, by Eston Chemicals, Inc., Los Angles, Calif. Claims use since Jan. 5, 1949.

PROLAN, in thin capital letters, for insecticides. Filed Nov. 30, 1949, by Commercial Solvents Corp., New York. Claims use since Oct. 10, 1949.

Classified Advertising

Rates for classified advertisements are ten cents per word, $2.00 minimum, except those of individuals seeking employment, where the rate is five cents per word, $1.00 minimum. Address all replies to Classified Advertisements with Box Number, care of AGRICULTURAL CHEMICALS, 254 W. 31st St., New York 1. Closing date: 25th of preceding month.

Positions Wanted:

Plant Pathologist: Ph.D. minor plant physiology; highest qualifications; publications; young; desires fundamental research work in the chemical control of disease in U. S. or abroad. Experience in root rot research and soil fumigation. Address Box No. 470, care of Agricultural Cheicals.

Chemist: Ten years experience with degrees in biochemistry and bacteriolgy. Can handle plant, production, sales, insecticides, fungicides, germicides, and allied specialties. Excellent record. Best refererces. Desires new connection with manufacturer in any capacity where experience and training will count. For further information, address Box No. 471, care of Agricultural Chemicals.

Plant Pathologist: With training in screening of organic compounds as fungicides, etc. Field experience in crop disease control and herbicides. Extension experience. Speak Spanish. No objection Latin American location. Address Box No. 470, care of Agricultural Chemicals.

Positions Open:

Field Representative: Agricultural chemical sales for large reputable manufacturer of basic insecticides. Degree in entomology, biology or equivalent experiment station or other experience required. Midwest territory. Address Box No. 468, care of Agricultural Chemicals.

Manufacturing Chemist: capable of handling production of chemical specialties, sanitary chemicals and insecticides. Must be capable of taking full charge of all production problems from equipment through finished products. Party must be willing to locate in leading Texas city. Company representative will be in New York City November 2nd through November 15th. Address Box No. 469, care of Agricultural Chemicals.

Contact Man, with broad backgrounl in economic poisons, and well-versed in chemistry. Could be an entomologist or horticulturist. Considerable travelling necessary. Give details of age, education, experience, also salary expected. Write Box AC 1848, 221 West 41st St., New York 18, N. Y.

For Sale:

For Sale: November 1950 to Spring 1951 delivery, 10% Gamma Benzene Hexachloride Dust concentrate and wettable powder. Pack fiber drums or 100# bags. Address inquiries to Chemical Formulators, Inc. Box 35 North-Charleston, W. Va. Also solicit inquiries for custom packaging, powder and liquid. Complete grinding blending and packaging service.

Hyman-Shell Statement

A statement outlining the working relations between Shell Chemical Corporation and Julius Hyman & Company has been issued by the two companies. The statement amplifies the previous announcement to the effect that Shell Chemical Corporation is the exclusive agent for domestic sale of unformulated aldrin and dieldrin made by Hyman.

On all matters of common interest, the two firms will work in close collaboration. Departments common to both remain intact, but will be coordinated so that each performs as far as possible complementary functions. Under the working agreement all ten Shell Chemical Corporation district offices are available to aldrin and dieldrin accounts. Both Hyman and Shell entomological and sales personnel will participate in product development and field service.

The Shell Agricultural Research Laboratory at Modesto, California, carries out cooperative research studies with Dr. Y. P. Sun, director of the Hyman Company's bioassay lab.

Dr. E. W. Bodine is in charge of Shell's Product Development work. He will work with W. E. McCauley, Dr. C. C. Compton and R. E. Hamman, Hyman entomologists, on problems of mutual interest in product development and field research.

The Hyman Company will continue the major basic research on the two products, including toxicological studies now well under way. Problems of a technical nature are referred to the Hyman Company's sales service laboratory. Residue studies are being carried on concurrently by both organizations.

C. S. C. Expands Staff

Commercial Solvents Corporation has announced additions to the staff of its Research and Development Department at Terre Haute, Indiana. Dr. Gerald C. M. Harris, formerly a mycologist in the Dyestuffs Division of I. C. I. Ltd. in England, has joined the company as a microbiologist. He was for several years on the research staff in the Department of Botany at Oxford University.

Dr. Bernard L. Lubin, formerly in the Calco Chemical Division of the American Cyanamid Company, has been employed as a chemical engineer. He received his doctor's degree from the University of Missouri. New microbiologist with the company is Theodore H. Elferdink, Jr., a graduate of the University of Michigan.

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Announces New Address

Theodore Riedeburg Associates have announced a new location in New York City, Sixty-third floor, Chrysler Building. The firm now represents the Emulsol Corporation, Chicago, and the Chase Products Co., Maywood, Ill.

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PCO's To Cincinnati

Holding its 18th annual convention at Cincinnati, the National Pest Control Association plans to have one of its largest registrations at the three-day meeting October 23-25. Headquarters are at the Netherland Plaza Hotel.

The program called for talks by Dr. Fred C. Bishopp, assistant chief, bureau of entomology and plant Quarantine, U.S.D.A., Washington; association secretary Wm. O. Buettner, New York; and association president, Harold E. Jennings, Chicago.

Dr. Bishopp's topics are "Fly Control in 1950" and "Using Insecticides Safely." Walter W. Dykstra will discuss "New Developments and Techniques in Rodent Control," and other topics slated for discussion include new insecticides, public relations, insurance and liability problems. The annual banquet will be held October 25.

Advertisers' Index

OCTOBER, 1950

(The Advertisers' Index has been checked carefully but no responsibility can be assumed for any omission)

TALE ENDS

THE 1951 Spring meeting of the Nat'l. Agricultural Chemicals Association may be held in Florida. Although not announced officially to attendants at the recent Spring Lake meeting, the talk about the Miami Beach gathering in the spring seemed to have the approval of NAC officials. The proximity of orange groves would permit a first-hand study of pest control in that area, it is pointed out . . . and it would be the first opportunity for the group as a whole to visit the citrus industry.

Credit for an assist in the Association's deciding on the Florida meeting, if they decide to go there, should go to Frank L. Holland, Florida Agricultural Research Institute, Winter Haven, and to W. Mercer Rowe, Flag Sulfur Co., Tampa, for their "salesmanship in bringing before the committee members, the advantages of a Florida convention."

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The editor, while en route to the recent centennial celebration of Pennsalt Co., stepped off the train in Philadelphia, and remembering that the company was to furnish transportation to its Whitemarsh Laboratories where the celebration was under way, climbed aboard a bus marked "Special," parked nearby. The occupants of the vehicle didn't look much like the type of business men who would be attending a centennial luncheon, and upon closer inspection, some famous faces appeared. There sat Joe DiMaggio & cohorts, big as life! The "Special" bus was taking the New York Yankees to the stadium for a tussle with the A's. But the team went without the editor. He escaped via the rear door just before the bus departed!

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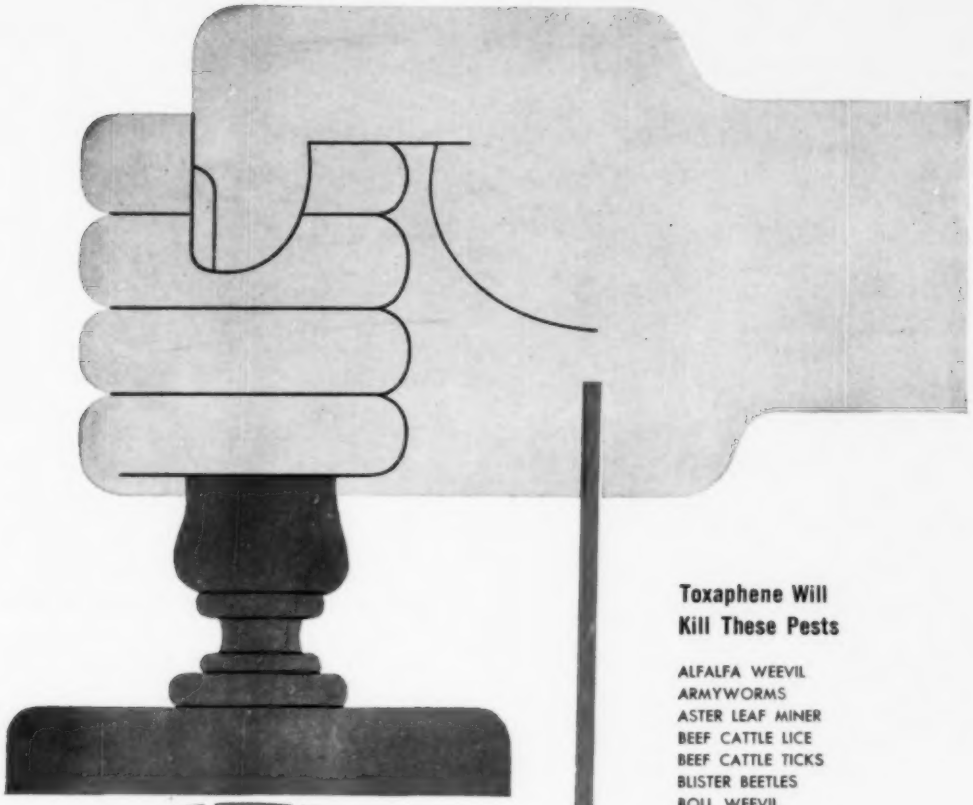
E. C. McClintic, chairman of the NAC Association traffic committee received compliments by the dozen for his work for the group. He had announced his resignation at the recent NAC meeting, but agreed to work with the committee in an ex-officio capacity. He has served on the committee for the past 16 years.



toxaphene

More detailed information summarizing current federal or state recommendations for the control of these pests is available from:

HERCULES POWDER COMPANY
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COTTON FLEAHOPPER
COTTON LEAFWORM
FALL ARMYWORM
GARDEN WEBWORM
GOAT LICE
GRASSHOPPERS
GREEN CUTWORM
HOG LICE
HORN FLY
LEAFHOPPERS
PEAR PSYLLA
RAPID PLANT BUG
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